TAKING STOCK

2002 North American Pollutant Releases and Transfers

Commission for
Environmental Cooperation
of North America

May 2005

Disclaimer

The National Pollutant Release Inventory (NPRI) and the Toxics Release Inventory (TRI) data sets are constantly evolving, as facilities revise previous submissions to correct reporting errors or make other changes. For this reason, both Canada and the United States "lock" their data sets on a specific date and use the "locked" data set for annual summary reports. Each year, both countries issue revised databases that cover all reporting years.

The CEC follows a similar process. For the purposes of this report, the TRI data set of June 2004 and the NPRI data set of July 2004 were used. The CEC is aware that changes have occurred to both data sets for the reporting year 2002 since this time that are not reflected in this report. These changes will be reflected in the next reports, which will summarize the 2003 data and make year-to-year comparisons with previous years' data.

This publication was prepared by the Secretariat of the Commission for Environmental Cooperation (CEC). The views contained herein do not necessarily reflect the views of the governments of Canada, Mexico or the United States of America.

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Chapter	Taking Stock

Preface

The mission of the Commission for Environmental Cooperation (CEC) is to foster the conservation, protection, and enhancement of the North American environment in the context of increasing economic and trade links among Canada, Mexico, and the United States.

Good information is the foundation upon which we can act to protect our shared environment. This is true for policy makers and the public alike—as the basis for sound decision making or simply to know what's happening in our communities. *Taking Stock*, the CEC's yearly analysis of the status and trends of the most commonly reported toxic chemicals released and transferred throughout the continent is a key part of this foundation.

Taking Stock provides environmental information in the spirit of right-to-know. With North America becoming increasingly integrated through economic and social ties, it is essential that all citizens have access to information on activities that impinge on the health of our shared environment. The data reported in *Taking Stock* are important indicators for policy makers, regulators, facility managers, CEOs, community groups, researchers and citizens to inform their various efforts to assess, reduce and prevent pollution. Compiling, comparing, and sharing this information supports decision-making at all levels of society to better manage toxic releases.

As always, *Taking Stock* builds on data collected by the national governments through their pollutant release and transfer registers (PRTRs), thereby providing a North American perspective on the generation and handling of toxic substances by industrial facilities. The "matched" data presented in *Taking Stock*, which we use to examine the sectors and chemicals that are common to the national systems, provide a common yardstick for analyzing what is happening across the continent with respect to the release, recycling and treatment of toxic chemicals generated by industry. Data from the 2002 reporting year, the most recent data publicly available at the time this report was initiated, are presented in this report, along with trend data dating back to 1995.

Until this year, *Taking Stock* was limited to information concerning the release and transfer of toxic chemicals in the United States and Canada. This report marks a major step forward by including comparable Mexican data for certain Criteria Air Contaminants for the first time. Mexico continues to progress in the implementation of its now mandatory PRTR program with the recent announcement of a list of 104 toxic chemicals that will become the basis for its reporting program. We look forward to including these chemicals in future editions of *Taking Stock*.

Last year marked the tenth anniversary of the CEC. A ten-year review undertaken to measure our progress and chart a path for the future made special reference to the importance of *Taking Stock*. Some observers cited *Taking Stock* as an example of CEC work that has helped "move the agenda forward" by making critical information accessible to the public. Others pointed out the limitations posed by aggregating all PRTR emissions data without considering relative toxicity, or information on economic production. These are important observations and will help shape *Taking Stock* into an even more relevant and meaningful document in the future.

Following the ten-year review, the CEC Council determined that *Information for Decision-making* would become one of three pillars to guide our work over the next ten years, together with Capacity Building and the exploration of Trade and Environment Linkages. *Taking Stock* thus remains at the core of our work activity.

As we close the first decade of the CEC, we trust that this report will help guide our collective pursuit of a clean and healthy environment and a strong economy. As always, we welcome your suggestions on how *Taking Stock* can continue to evolve and in order to better meet your needs. We especially want to increase collaboration with the private sector across North America to help improve the quality and consistency of PRTR reporting across our three countries.

William V. Kennedy
Executive Director

Acknowledgements

Numerous groups and individuals have played important roles in bringing this report to fruition.

Officials from Environment Canada, Semarnat and the US EPA contributed vital information and assistance throughout the report's development. This past year we have worked with the following officials from these agencies: Canada—Arun Chatterjee, Alain Chung and François Lavallée; Mexico—MariCruz Rodriguez Gallegos, Sergio Sánchez Martínez, Juan David Reyes Vazquez, Ivette Garcia, Floreida Paz Benito, Fabiola Ramirez Hernández, Victor Manuel Sánchez Rodriguez, Teresa Zarate Romano, Pedro Miguel Ramirez Ramirez; and the United States—John Dombrowski and Michelle Price.

Special thanks and recognition go to the team of consultants who worked tirelessly to put this report together: Catherine Miller of Hampshire Research Institute (United States); Sarah Rang of Environmental Economics International (Canada); Isabel Kreiner of UV Lateinamerika S. de R.L. de C.V. (Mexico). Thanks also go to Hampshire Research Institute, in particular, to Rich Puchalski and Catherine Miller for their work in creating the *Taking Stock Online* web site <http://www.cec.org/takingstock/>.

A number of CEC Secretariat staff have been involved in the development and launching of this report and the companion web site. Vic Shantora, head of the Pollutants and Health program, kept us focused on the big picture, on the essential nature of this report within the pollution prevention and reduction policy arena. Marilou Nichols, program assistant, provided continuing assistance throughout this process. Paul Miller provided helpful perspectives for the new three-country data. Erica Phipps, consultant, was indispensable in guiding the development of the *Taking Stock* series, including coordinating the public consultations. The CEC's publications staff have handled the tremendous task of coordinating the editing, translation and publication of the document in the three languages. Evan Lloyd and Spencer Ferron-Tripp were instrumental in coordinating the public release of the document. We look forward to working with Keith Chanon, the CEC's new PRTR program manager.

Above all, CEC would like to thank the many individuals and groups from throughout North America who have given generously of their time and ideas to the development of this report through their participation in the Consultative Group for the North American PRTR Project.

Become Involved in the Development of *Taking Stock*

Taking Stock is developed with the advice of governments, industry and nongovernmental organizations and citizens from the three North American countries.

For more information or to get involved in the CEC's North American PRTR project, please contact:

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Contacting and Obtaining Information from North America's Pollutant Release and Transfer Registers

Public Access to Canadian National Pollutant Release Inventory Data and Information

Information on NPRI, the annual report, and the databases can be obtained from Environment Canada's national office:

Headquarters:
Tel: (819) 953-1656
Fax: (819) 994-3266

NPRI data on the Internet, in English: <http://www.ec.gc.ca/pdb/npri/npri_home_e.cfm>
NPRI data on the Internet, in French: <http://www.ec.gc.ca/pdb/npri/npri_home_f.cfm>
e-mail: npri@ec.gc.ca
Pollution Watch Scorecard home page: <http://www.pollutionwatch.org/>

Additional Information on *Mexican Registro de Emisiones y Transferencia de Contaminantes* (RETC)

Semarnat
Dirección de Gestión Ambiental
Av. Revolución 1425 – 9
Col. Tlacopac, San Angel
01040 Mexico, D.F.
Tel: (525) 55 624–3470
Fax: (525) 55 624–3584

Semarnat on the Internet: <http://www.semarnat.gob.mx>
RETC: <http://www.semarnat.gob.mx/dgca/retc/general/gral.shtml>

Public Access to US Toxics Release Inventory Data and Information

The EPA's TRI User Support (TRI-US), (800) 424-9346 within the United States or (202) 260-1531, provides TRI technical support in the form of general information, reporting assistance, and data requests.

TRI information and selected data on the Internet: <http://www.epa.gov/tri>

Online Data Access:
TRI Explorer: <http://www.epa.gov/triexplorer>
EPA's Envirofacts: <http://www.epa.gov/enviro/html/toxic_releases.html>
RTK-NET: <http://www.rtk.net>
National Library of Medicine's Toxnet (Toxicology Data Network) computer system: <http://toxnet.nlm.nih.gov/>
Environmental Defense Scorecard home page: <http://www.scorecard.org>

Acronym	Meaning
CAC	Criteria Air Contaminant
CAS	Chemical Abstract Service
CEC	Commission for Environmental Cooperation
CEPA	Canadian Environmental Protection Act
C.I.	Color index
CMAP	*Clasificación Mexicana de Actividades y Productos* (Mexican Activities and Products Classification)
CO	Carbon monoxide
COA	*Cédula de Operación Anual* (Annual Certificate of Operation)
EPA	US Environmental Protection Agency
EPCRA	US Emergency Planning and Community Right-to-Know Act
HCB	Hexachlorobenzene
IARC	International Agency for Research on Cancer
IFCS	Intergovernmental Forum on Chemical Safety
INE	*Instituto Nacional de Ecología* (Mexican National Institute of Ecology)
IOMC	Inter-Organization Programme for the Sound Management of Chemicals
iTEQ	International Toxic Equivalents
kg	Kilograms
LGEEPA	*Ley General del Equilibrio Ecológico y la Protección al Ambiente* (General Ecological Equilibrium and Environmental Protection Law)
MSDS	Material Safety Data Sheet
MSTP	Municipal sewage treatment plant
NAICS	North American Industry Classification System
NCASI	National Council of the Paper Industry for Air and Stream Improvements
NEI	US National Emissions Inventory
NMX	*Norma Mexicana* (Mexican Standard)
NOM	*Norma Oficial Mexicana* (Mexican Official Standard)
NO_x	Nitrogen oxides
NPRI	National Pollutant Release Inventory (PRTR for Canada)
NTP	US National Toxicological Program
OECD	Organization for Economic Cooperation and Development
PBT	Persistent bioaccumulative toxicant

PDIA	*Programa de Desarrollo Institucional Ambiental* (Program of Institutional Environmental Development)
POTWs	US publicly owned treatment works
PM	Particulate matter
PRTR	Pollutant release and transfer register
RETC	*Registro de Emisiones y Transferencias de Contaminantes* (PRTR for Mexico)
Semarnat	*Secretaría de Medio Ambiente y Recursos Naturales* (Mexican Secretariat of the Environment and Natural Resources)
SIC	Standard Industrial Classification
SO_2	Sulfur dioxide
TEF	Toxic equivalency factor
TEQs	Toxic equivalents
TRI	Toxics Release Inventory (PRTR for US)
UN/ECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNITAR	United Nations Institute for Training and Research
US	United States
VOC	Volatile organic compound

Carcinogens
The International Agency for Research on Cancer <http://www.iarc.fr> and the US National Toxicological Program <http://ntp-server.niehs.nih.gov> evaluate chemical substances for their cancer-causing potential. Chemicals in the matched data set that have been designated as known or suspected carcinogens by one or both agencies are analyzed in this report.

Chemical category
A group of closely-related individual chemicals that are counted together for purposes of PRTR reporting thresholds and release and transfer calculations. The chemicals are reported to the PRTRs under a single name.

Energy recovery
The combustion or burning of a wastestream to produce heat.

Environmental management hierarchy
The types of waste management plus source reduction prioritized as to environmental desirability. In order of preference, the one most beneficial to the environment is source reduction (prevention of pollution at its source), followed by recycling, energy recovery, treatment, and disposal as the least desirable option.

Form
The standardized data that are submitted for each chemical by a facility. In NPRI one form is submitted for each chemical. In TRI generally one form is submitted for each chemical. However, more than one may be submitted in cases where different operations at a facility use the same chemical.

Fugitive emissions
Air emissions that are not released through stacks, vents, ducts, pipes, or any other confined air stream. Examples are equipment leaks or evaporation from surface impoundments.

Incineration
A method of treating solid, liquid, or gaseous wastes by burning.

Matched data set
Compilation of data for reporting elements that are comparable among the PRTRs. The "matched" data set selects from each PRTR only those industry sectors and those chemicals that are reported the same under both systems. Which industries and chemicals are included in the matched data set may differ from year to year depending on changes in reporting in one or the other of the systems.

Nonpoint sources
Diffuse sources such as from mobile sources (that is, motor vehicles and other forms of transportation), area sources (such as, agriculture or parking lots), or small sources (such as, dry cleaners or automobile service stations). These sources are not generally covered in PRTRs but may be substantial contributors to pollution of the chemicals reported under PRTRs.

Nonproduction-related waste
Waste that is generated as a one-time event, including large accidental spills, waste from a remedial action to clean up the environmental contamination from past disposal practices, or other wastes not occurring as a routine part of production operations. This does not include spills that occur as a routine part of the production operations that could be reduced or eliminated by improved handling, loading or unloading procedures.

Off-site releases
Chemicals in waste that are moved off the grounds of the facility and sent to other facilities or other locations for disposal. They are activities that are similar to on-site releases, but that occur at other locations. They also include metals sent to disposal, treatment, sewage, and energy recovery. This approach recognizes the physical nature of metals and acknowledges that metals in such wastes are not likely to be destroyed or burned and so may eventually enter the environment.

Off-site transfers
Chemicals in waste that are moved off the grounds of the facility, including transfers of waste sent to other facilities or other locations, such as hazardous waste treatment facilities, municipal sewage treatment plants or landfills. See also off-site releases and transfers for further management.

On-site
Within the boundaries of the facility, including areas where wastes may be stored, treated or disposed of that are separate from the production processes but still within the boundaries of the reporting facility.

On-site releases
Chemicals in waste released on-site to air, water, underground injection, or land at the location of the reporting facility.

Otherwise used
Any use of a chemical that is not manufacturing or processing, such as the use as a chemical processing aid, a manufacturing aid or an ancillary use during the production process.

Ozone depleter
A substance that contributes to the destruction of the stratospheric ozone layer, a layer of the atmosphere which lies approximately 15-40 kilometers above the Earth's surface.

Point source
The origin of known or deliberate environmental releases from fixed points such as smokestacks and wastewater discharge pipes.

Pollution prevention
A strategy for reduction of pollution that involves preventing the generation of waste in the first place, rather than cleaning it up, treating it, or recycling it after it has been produced. TRI and NPRI indicate actions undertaken to reduce the generation of waste. NPRI facilities may also indicate on-site reuse, recycling or recovery as a category of action to prevent pollution; TRI source reduction (pollution prevention) reporting does not include this category. See also source reduction activity.

Processing use
The use of a chemical as part of a chemical or physical process, including as a reactant, in processing a mixture or formulation, or as an article component.

Production ratio/activity index
The ratio of the production level associated with the chemical in the current reporting year to the previous year's level.

Production-related waste
A term used by the US EPA to denote chemical waste generated as a result of routine production that could potentially be reduced or eliminated by improved handling, more efficient processes, change of product or in product quality, or change in raw materials. This does not include spills resulting from large-scale accidents or waste from remedial actions to clean up contamination. As used by the US EPA, it includes chemicals released, sent off-site for disposal, recycling and energy recovery, and recycled or used for energy recovery on-site.

Recycling
Extraction of a chemical from a manufacturing process stream that would otherwise have been treated as waste, with the extracted chemical being reused in the original production process, in another production process, or sold as a separate product.

SIC codes
The standard industrial classification codes used to describe the types of activities or operations performed by an industrial facility. The actual groups of activities or operations (and, therefore, the codes) differ from country to country. The North America Industrial Classification System (NAICS) has been established and is in the process of being adopted by the United States, Canada and Mexico.

Source Reduction Activity
The types of activities undertaken to accomplish source reduction. The term includes equipment or technology modifications, process or procedure modifications, reformulations or redesign of products, substitution of raw materials, and improvements in housekeeping, maintenance, training, or inventory control. See also pollution prevention.

Total Releases
The sum of on-site and off-site releases, including the amounts released to the air, water, land and underground injection at the facility and all chemicals sent to other locations for disposal and any metals sent to treatment, sewage or energy recovery.

Total Reported Amounts
The sum of on- and off-site releases and transfers to recycling and other transfers for further management. This is the best estimate of a facility's total amount of chemicals requiring management that is available for the PRTR data.

Tonne
A metric tonne, which is 1,000 kilograms or 1,1023 short tons or 0.9842 long tons.

Transfers for further management
Chemicals in waste that are sent from the reporting facility to a facility that treats (including sewage treatment plants) or burns the chemical for energy recovery.

Treatment
A variety of processes that change the chemical in waste into another substance. Treatment also includes physical or mechanical processes that reduce the environmental impact of the waste. This is the term used in TRI reports to summarize chemical, physical, biological treatment and incineration.

Waste
The amount of the chemical that does not become a product and is not consumed or transformed during the production process. PRTRs differ as to whether materials destined for recycling or energy recovery are included or not in their definition of waste.

Executive Summary

Executive Summary

North Americans are concerned about the effects of chemicals on their health and their environment. Pollutant release and transfer registers (PRTRs) are designed to track the quantities of chemicals released from industrial activities into the air, water or land and provide detailed information on the types, locations and amounts of chemicals that facilities have released or transferred. Results are fed into a national database, which allows information to be made available to the public by chemical, community, or facility and over time.

The Commission for Environmental Cooperation (CEC) recognizes the importance of PRTRs, such as the Toxics Release Inventory (TRI) in the United States, the National Pollutant Release Inventory (NPRI) in Canada, and the *Registro de Emisiones y Transferencia de Contaminantes* in Mexico, for their potential to enhance the quality of the North American environment. This *Taking Stock* is the ninth of the CEC's annual studies of these programs and comparison of their data. It analyzes publicly available data from TRI and NPRI from reporting year 2002 (the most current available), as well as trends in reported data from 1995 to 2002. As Mexico's RETC data become available (reporting was voluntary for 2002), they will be included in future reports.

In addition, data on criteria air contaminants for 2002 are included. Air releases of these pollutants were reported for the first time to NPRI for 2002 and comparable data are provided from the draft preliminary reporting to the 2002 US National Emissions Inventory and the Mexican Annual Certificate of Operation (*Cédula de Operación Anual*—COA), Section 2.

The PRTR data used as the basis of this report do not account for all sources of releases and transfers or all chemicals. Many sources of chemical releases—small sources such as dry cleaners, gasoline service stations, mobile sources such as cars and trucks, area sources such as farms and natural sources such as volcanoes—are not included in PRTR data and hence are not within the purview of this report. Likewise, small manufacturing companies with fewer than 10 employees or that fall below the stipulated processing, manufactured or "otherwise used" thresholds are also not required to report to PRTRs. A limited number of chemicals must be reported to TRI (about 650) and NPRI (about 275)—far fewer than the tens of thousands estimated to be in commerce. So while PRTR data can provide important information on releases and transfers of chemicals, this information should be seen as part of a larger pollution picture.

Each country's PRTR has evolved with its own list of chemicals and industries. In order to obtain a North American picture of releases and transfers of chemicals, not all data submitted to the individual countries' PRTR systems can be used; only those data common to both systems. This matching process eliminates chemicals reported under one system but not the other. It also eliminates data from industry sectors covered by one PRTR but not the other. Thus, the North American database used in this report consists of matched data of industries and chemicals common to NPRI and TRI.

In the matched data, over 3.25 million tonnes of toxic chemicals were released and transferred in North America in 2002. One-quarter were on-site air releases (for both Canada and the United States). One-third were transferred off-site for recycling, although for Canada, half were transferred to recycling and 2 percent were transferred to energy recovery while for the United States, one-third were transferred for recycling and 20 percent to energy recovery (**Table 4–1**).

Three states and one province accounted for more than one-quarter of total releases and transfers in North America in 2002: Texas, Ohio, Ontario and Michigan (**Table 4–2**). More than one-quarter of all North American releases (both on- and off-site) originated in four states: Arizona, Ohio, Texas and Indiana (**Map 5–1**). Ontario, the Canadian province with the largest releases, ranked sixth in North America for total releases.

Electric utilities reported the largest total releases of any matched industry sector in North America, with 45 percent of all air releases (mainly hydrochloric acid). The primary metals sector accounted for the second-largest total releases, with 24 percent of total releases (mainly zinc and its compounds transferred to disposal) (**Table 5–3**).

Among the more than 24,000 reporting facilities in North America, the 50 with the largest total releases contributed almost one-third of the total releases in 2002. They included 19 electric utilities and 15 primary metals facilities. Among these 50 facilities were two electric utilities in Canada; the remaining were located in the United States (**Table 5–5**).

Canada had a higher percentage of total releases from paper products, rubber and plastics, and transportation equipment manufacturing sectors. The United States had higher percentages from electric utilities, primary metals and chemical manufacturers (**Figure 5–3**).

Average total releases per facility were about the same in Canada and the United States. However, average air releases per facility were over one-third higher in Canada than in the United States. Average on-site land disposal and surface water discharges per facility in the United States were twice those in Canada. On the other hand, the average off-site transfers to disposal of non-metals and off-site transfers to recycling in Canada were almost twice those in the United States (**Table 4–4**).

Analysis of changes in releases and transfers in NPRI and TRI over time highlight individual facilities, industrial sectors and states and provinces reporting lower or higher releases and transfers. The report includes trends from 1998 to 2002, which include manufacturing sectors as well as electric utilities, hazardous waste and solvent recovery facilities, coal mining, and chemical wholesale distributors. Trends from 1995 to 2002 include just manufacturing sectors because the other sectors have reported to TRI only since 1998.

Total releases and transfers fell by 7 percent from 1998 to 2002, but had risen by 3 percent in the most recent period from 2001 to 2002. Total releases decreased by 11 percent from 1998 to 2002 (**Table 6–1**). For the manufacturing sectors, total releases decreased by 12 percent from 1995 to 2002 (**Table 7–1**).

Canadian total releases and transfers increased by 7 percent from 1998 to 2002, including an increase in on-site air releases of 8 percent. The Canadian NPRI experienced an increase in the number of facilities reporting to it over the time period 1998 to 2002. For facilities reporting in both 1998 and 2002, NPRI total releases and transfers decreased by 3 percent, however air releases from those facilities increased by 1 percent (**Table 6–1**).

US total releases and transfers decreased by 8 percent from 1998 to 2002, but had risen in the most recent period from 2001 to 2002. The number of US facilities reporting to TRI decreased over that time period and total releases and transfers from US facilities reporting in both 1998 and 2002 decreased by 6 percent, including an 18 percent decrease in air releases (**Table 6–1**).

Because a small group of facilities report large amounts of releases and transfers and tend to dominate the database, this year's *Taking Stock* also analyzes the data without the largest facilities. The group of facilities with the largest reported releases and transfers had an overall decrease of 8 percent in total releases and 17 percent in air releases. The group of facilities with the smallest reported releases and transfers showed an overall increase of more than 150 percent in total releases and of 84 percent in air releases from 1998 to 2002. This was true for both Canada and the United States (**Table 6–9**).

Most off-site transfers are sent for recycling to sites within the country's borders. Cross-border transfers are sent by a few facilities, 285 US facilities and 163 Canadian facilities. Cross-border transfers from Canada to the United States increased by 25 percent from 1998 to 2002, while off-site transfers to sites within Canada increased by 5 percent. Cross-border transfers from the United States to Canada decreased by 44 percent from 1998 to 2002, while off-site transfers to sites within the United States increased by 5 percent (**Table 8–11**).

Known or suspected carcinogens accounted for 10 percent of total releases in 2002 (**Table 9–1**). This group of chemicals decreased by 26 percent from 1998 to 2002, compared to a decrease of 11 percent for all matched chemicals (**Figure 9–2**).

Chemicals linked to cancer or birth defects (California Proposition 65 chemicals) were 12 percent of total releases in 2002 (**Table 9–9**). This group of chemicals decreased by 31 percent from 1998 to 2002, compared to a decrease of 11 percent for all matched chemicals (**Figure 9–5**).

Persistent, bioaccumulative toxic chemicals (PBTs) are reported to NPRI and TRI under lower thresholds than other chemicals. These include such chemicals as lead, mercury, dioxins, hexachlorobenzene and polycyclic aromatic compounds. The reporting requirements differ for some PBTs, but those for both lead and mercury are similar and can be included in the matched database.

More than four times as many facilities reported on lead and its compounds than previously under the lowered reporting thresholds. In 2002, total releases of lead and its compounds were 43 million kilograms with air releases 2 percent of the total releases (**Table 10–1**). While Canadian facilities reported 9 percent of total releases of lead and its compounds, they reported 42 percent of air releases. Three primary metals facilities in Canada reported the largest air releases in North America, accounting for 30 percent of total air releases of lead and its compounds in 2002 (**Table 10–5**). Electric utilities (oil and coal-fired power plants only) had the largest surface water discharges of lead and its compounds and the second largest air releases (behind primary metals facilities), and third largest on-site land releases (**Table 10–3**). Three-quarters of all releases and transfers of lead and its compounds were transfers to recycling. The electronic/electrical equipment manufacturing sector had the largest transfers to recycling of any industry sector, accounting for over half (54 percent) of all transfers to recycling of lead and its compounds (**Table 10–8**).

Mercury and its compounds have been reported under lower thresholds since the 2000 reporting year. In 2002, total releases of mercury and its compounds were over 243 tonnes with air releases accounting for more than one-quarter of this amount (**Table 10–16**). US facilities in Texas reported the largest air releases of mercury and its compounds, accounting for 11 percent of total air releases in 2002 (**Table 10–17**). Electric utilities (oil and coal-fired power plants only) reported two-thirds (65 percent) of all air releases in 2002 (**Table 10–18**). From 2000 to 2002, total releases of mercury and its compounds decreased by 56 percent. Air releases decreased by 10 percent in both Canada and the United States (**Table 10–22**).

The year 2002 is the first year NPRI required reporting on criteria air contaminants (CACs). The Mexican COA has mandatory reporting for three CACs. TRI does not require reporting on these pollutants, but the US has a preliminary draft National Emissions Inventory (NEI) for CACs for 2002. Comparable data from these national databases were selected based on substance, reporting threshold and industry sector.

Comparable data from Canada and the United States include carbon monoxide, nitrogen oxides, particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide and volatile organic compounds, and is based on US reporting thresholds. Comparable data from all three countries include air releases of nitrogen oxides, sulfur dioxide and volatile organic compounds, and is based on US reporting thresholds and Mexican industry sectors.

CACs are emitted from a variety of sources, including fuel combustion, industrial process, vehicles (mobile sources) and agricultural activities. The first two are the ones covered by our database. Major sources of sulfur dioxide are industrial and combustion processes. Mobile sources are the major emitters of VOCs and, in urban areas, of carbon monoxide. Both industrial and mobile sources are sources of nitrogen oxides. Direct emissions of particulates are more often from other sources, such as construction sites, unpaved roads, and agricultural activities.

Nitrogen Oxides: US facilities accounted for 61 percent of nitrogen oxides releases, Mexican facilities for 34 percent and Canadian facilities for 5 percent. Electric utilities reported the largest amounts in all three countries (**Table 3–7**).

Sulfur Dioxide: US facilities accounted for 73 percent of sulfur dioxide releases, Mexican facilities for 14 percent and Canadian facilities for 13 percent. In the United States and Mexico, electric utilities reported the largest amounts. In Canada, primary metals facilities reported the largest air releases (**Table 3–9**).

Volatile Organic Compounds: US facilities accounted for 76 percent, Canadian facilities for 18 percent and Mexican facilities for 6 percent of the releases of these compounds. In the United States and in Mexico, chemical manufacturers reported the largest air releases of VOCs. In Canada, the oil and gas extraction sector had the largest such releases (**Table 3–10**).

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Introduction

This report is intended to serve as an information source for governments, industry and communities in analyzing such data from a North American perspective and for identifying opportunities for pollution reduction. The analyses are based on 1995–2002 data from the US Toxics Release Inventory (TRI) and the Canadian National Pollutant Release Inventory (NPRI). Results from 2002, trends over the eight years from 1995 to 2002, and from 1998 to 2002 are presented here. As data become available from the Mexican *Registro de Emisiones y Transferencia de Contaminantes* (voluntary for the 2002 reporting year), they will be included in future reports. This year, for the first time, information on criteria air contaminants from Canada, Mexico and the United States is included, since NPRI has added reporting on criteria air contaminants starting with the 2002 reporting year.

Taking Stock 2002 is the ninth in the CEC's *Taking Stock* series on sources, releases and transfers of industrial pollutants in North America.

Scope of this Year's Report

Taking Stock 2002 includes:

- data on releases and transfers of toxic chemicals from industrial facilities for 2002 (**Chapters 4** and **5**);
- five-year trends in releases and transfers of toxic chemicals (1998–2002) (**Chapter 6**)
- eight-year trends in releases and transfers of toxic chemicals from manufacturing sectors (1995–2002) (**Chapter 7**);
- transfers for recycling, energy recovery, treatment and disposal within and between US and Canada. (**Chapter 8**);
- analyses of groups of chemicals (**Chapter 9**):
  - carcinogens, and
  - chemicals associated with cancer, reproductive and developmental effects (California Proposition 65 chemicals);
- a special look at lead and its compounds (**Chapter 9**);
- reporting on persistent bioaccumulative toxics (PBTs), including mercury, dioxins and furans, hexachlorobenzene and polycyclic aromatic compounds (**Chapter 10**); and
- industrial air releases of criteria air contaminants for 2002 (**Chapter 3**).

New in this year's report are the special analyses on:

- lead and its compounds, looking at the data on releases and transfers as well as providing context on lead's health and environmental effects (**Chapter 10**), and
- industrial air releases of criteria air contaminants, since they were reported through NPRI for the first time for 2002 (**Chapter 3**).

While this report can provide answers to many questions, readers may need to go to other sources for more information. The report does not provide information on all pollutants, all sources of chemicals, data from facilities in Mexico (with the exception of criteria air contaminants), environmental damage, or health risks.

This report uses data from Canada and the United States. The data are "matched" for a particular span of years; that is, they are based on chemicals and industrial sectors that are common to both TRI and NPRI for the years in question. Reporting to the Mexican PRTR system was voluntary for 2002 and prior years, and thus the data are not currently comparable.

CEC Action Plan to Enhance the Comparability of Pollutant Release and Transfer Registers in North America

The governments of Canada, Mexico and the United States have worked together through the CEC's PRTR program to develop an action plan to implement changes in their respective PRTRs that will enhance the comparability of the three systems. Much progress has already been made, including:

- expanding the number of industries covered under TRI,
- adding mandatory reporting of transfers to recycling and energy recovery to the NPRI,
- expanding both the chemical lists and the reporting on persistent bioaccumulative toxic chemicals (NPRI and TRI),
- requiring reporting on pollution prevention activities (NPRI), and
- the adoption of a mandatory requirement for RETC reporting in Mexico.

The Action Plan to Enhance the Comparability of PRTRs in North America, adopted by the CEC Council in June 2002, identifies specific issues for which action is still needed, such as:

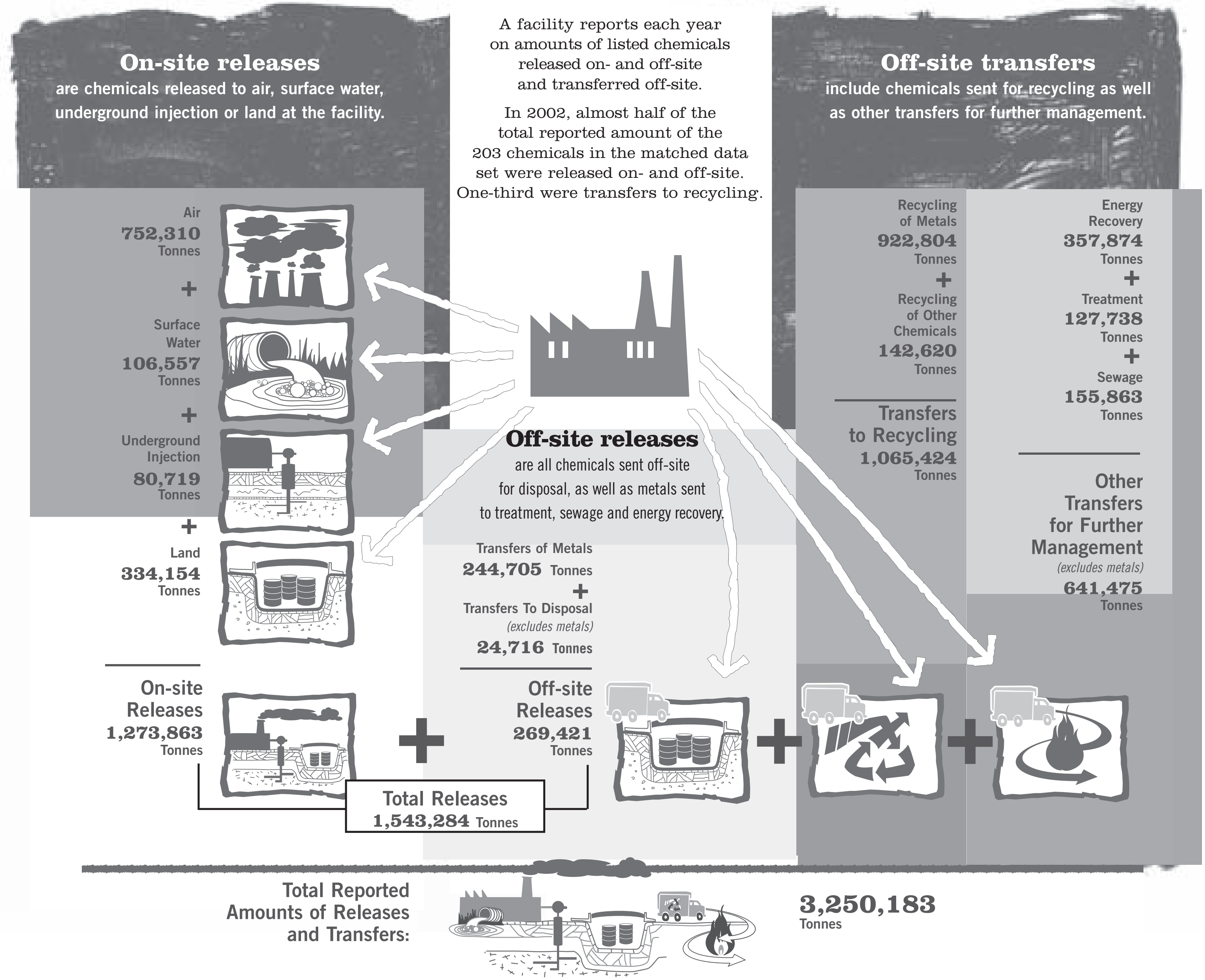
- lists of chemicals,
- use of standardized North American industry-sector classification codes, and
- types of reporting thresholds and exemptions used.

The Action Plan includes a description of such issues and outlines steps to be taken by the national programs to increase the comparability among the three systems. The Action Plan can be found on the CEC web site at <http://www.cec.org>.

Taking Stock Online

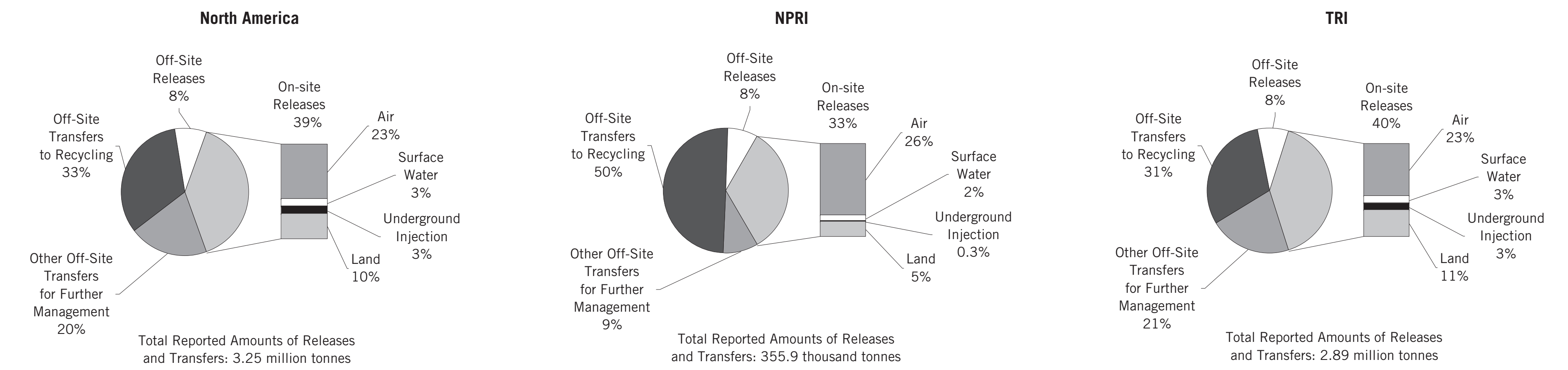
The *Taking Stock 2002* report, past volumes of *Taking Stock* (as PDF files), and searchable access to the data sets used in *Taking Stock 2002* are all available at *Taking Stock Online*. Try Taking Stock Online at <http://www.cec.org/takingstock>. The web site permits searches of the entire matched data set from 1995 to 2002 and allows users to customize reports. Queries can be made by chemical, facility, sector, or geographic region. The site also includes links to electronic versions of *Taking Stock* reports, the three North American PRTRs, and other PRTR-related information.

Figure 1. Pollutant Releases and Transfers in North America, 2002



Note: Canada and US data only. Mexico data not available for 2002. Analyses are based on the matched set of chemicals and industry sectors for which comparable data are available for 2002. Total on-site releases are greater than the sum of the individual media because an NPRI facility can report only the total if it is less than one tonne.

Figure 2. Total Reported Amounts of Releases and Transfers in North America by Category, 2002



Note: Canada and US data only. Mexico data not available for 2002.

2002 Results

The data for 2002 include reporting by 24,192 industrial facilities in North America on:

- the set of 203 chemicals common to both NPRI and TRI;
- manufacturing facilities, as well as electric utilities, hazardous waste management/solvent recovery facilities, chemical wholesale distributors, coal mining and petroleum bulk storage terminals; and
- all categories of releases and transfers, including transfers to recycling and energy recovery.

Analyses of 2002 data are presented in **Chapter 4** (total releases and transfers) and **Chapter 5** (total releases).

Releases and Transfers in North America in 2002

In 2002, over 3.25 million tonnes of matched chemicals were released and transferred in North America (Figure 1 and **Chapter 4**, Table 4–1). Almost half of the total reported amounts of releases and transfers (1.54 million tonnes) were released on- and off-site. Almost one-quarter, 752,300 tonnes, were released into the air at facility sites. This large amount of chemicals emitted to the air was more than all the chemicals released on-site to land, water and underground injection combined.

One-third of the total reported amounts, almost 1.07 million tonnes, were substances sent off-site for recycling. About 20 percent, or 641,500 tonnes, were other transfers for further management, including to energy recovery, treatment, and sewage (Figure 2).

NPRI facilities reported 11 percent of the total North American amounts, while TRI facilities had 89 percent of the North American total reported amounts (See **Chapter 4**, Table 4–1). Total releases on- and off-site were 41 percent of total releases and transfers in NPRI and were 48 percent in TRI. NPRI on-site air releases comprised 26 percent of total releases and transfers compared to 23 percent in TRI. On the other hand, surface water discharges and on-site land releases were proportionally higher in TRI than in NPRI. Also, NPRI transfers to recycling accounted for 50 percent of total releases and transfers while TRI recycling was 31 percent, and TRI other transfers for further management were 21 percent of total releases and transfers while NPRI's accounted for 9 percent.

Releases of Carcinogens and Chemicals Causing Reproductive and Developmental Harm

Almost 10 percent of all releases of chemicals in North America in 2002 were known or suspected carcinogens. For NPRI facilities, most carcinogens (59 percent) were released to the air. For TRI facilities, 39 percent of carcinogens were released to the air and 27 percent were on-site land releases, mainly disposal in landfills. (See **Chapter 9**, Figure 9–1.)

Almost 12 percent of all releases were chemicals known to cause cancer, reproductive or developmental harm (California Proposition 65 chemicals). For NPRI facilities, 67 percent of these chemicals were released to the air. For TRI facilities, 47 percent were released to the air and 23 percent were on-site land releases, mainly disposal in landfills. (See **Chapter 9**, Figure 9–4.)

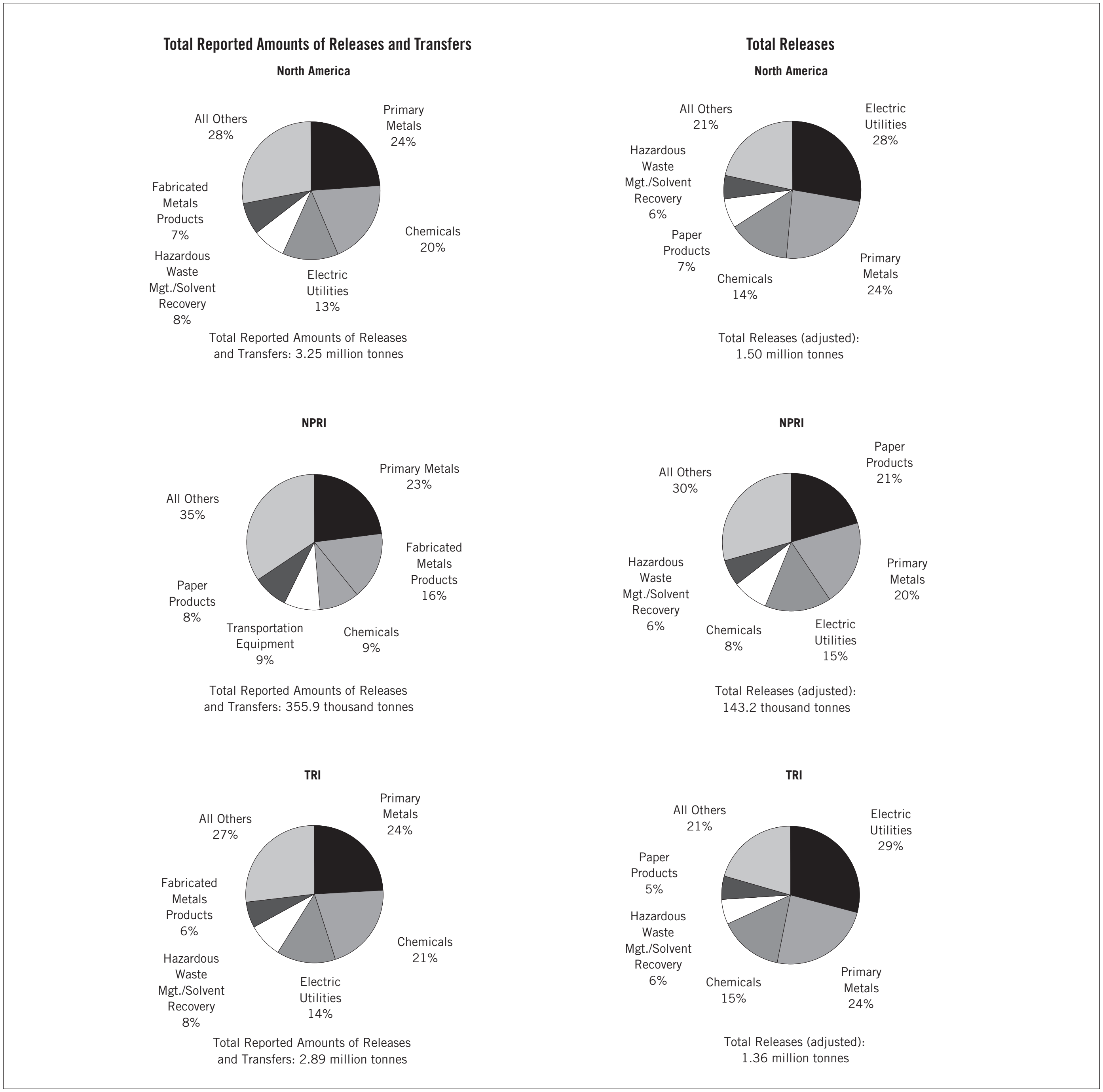
Industry Sectors with the Largest Amounts in North America in 2002

Five industries—primary metals, chemical manufacturing, electric utilities, hazardous waste management/solvent recovery and fabricated metals products—accounted for almost three-quarters of total releases and transfers in North America in 2002 (Figure 3 and **Chapter 4**, Table 4–3). In TRI, the sectors with the largest totals were primary metals and chemical manufacturing; in NPRI, the primary metals and fabricated metals sectors had the largest totals.

Looking at releases alone, electric utilities reported almost 28 percent of total releases in North America. The primary metals, chemical manufacturing, paper products, and hazardous waste management/solvent recovery sectors had the next-largest total releases (Figure 3 and **Chapter 5**, Table 5–3).

In TRI, electric utilities and the primary metals and chemical manufacturing sectors reported the largest total releases. These three sectors accounted for over two-thirds of total TRI releases. For NPRI, paper products, primary metals and electric utilities reported the largest total releases. These three sectors accounted for over half of total NPRI releases.

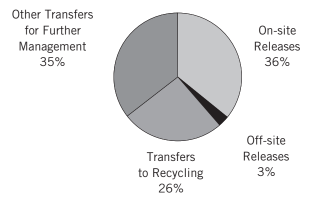
Figure 3. Contribution of Top Industry Sectors to Total Reported Amounts of Releases and Transfers and to Total Releases, 2002



Note: Canada and US data only. Mexico data not available for 2002.

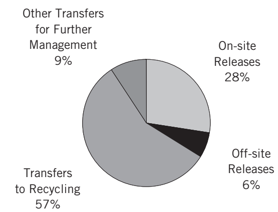
Figure 4. States/Provinces with Largest Total Reported Releases and Transfers Amounts in 2002 (Ordered by Total Reported Amounts)

Texas



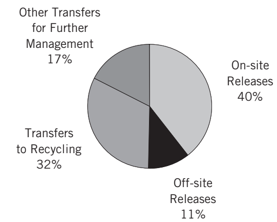
	tonnes
On-site Releases	90,933
Off-site Releases	7,449
Transfers to Recycling	65,282
Other Transfers for Further Management	90,452
Total Reported Amounts of Releases and Transfers	254,116
Number of Facilities	1,354
2002 Population (000)	21,737
Land Area (sq/km)	678,305
2002 Gross Domestic Product (millions of US$)	773,455

Ontario



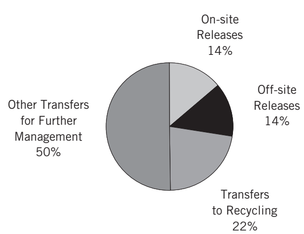
	tonnes
On-site Releases	58,124
Off-site Releases	13,516
Transfers to Recycling	120,600
Other Transfers for Further Management	19,393
Total Reported Amounts of Releases and Transfers	211,632
Number of Facilities	1,256
2002 Population (000)	12,097
Land Area (sq/km)	1,068,586
2002 Gross Domestic Product (millions of US$)	304,462

Ohio



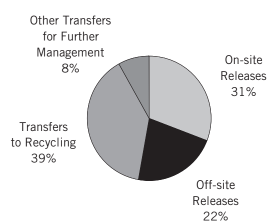
	tonnes
On-site Releases	82,877
Off-site Releases	22,468
Transfers to Recycling	67,866
Other Transfers for Further Management	36,524
Total Reported Amounts of Releases and Transfers	209,735
Number of Facilities	1,542
2002 Population (000)	11,409
Land Area (sq/km)	106,060
2002 Gross Domestic Product (millions of US$)	388,224

Michigan



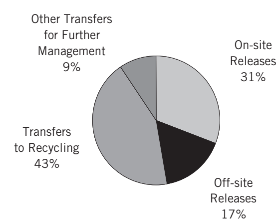
	tonnes
On-site Releases	27,275
Off-site Releases	26,986
Transfers to Recycling	43,987
Other Transfers for Further Management	99,220
Total Reported Amounts of Releases and Transfers	197,468
Number of Facilities	872
2002 Population (000)	10,043
Land Area (sq/km)	147,124
2002 Gross Domestic Product (millions of US$)	351,287

Indiana



	tonnes
On-site Releases	56,136
Off-site Releases	39,899
Transfers to Recycling	71,198
Other Transfers for Further Management	14,631
Total Reported Amounts of Releases and Transfers	181,864
Number of Facilities	986
2002 Population (000)	6,157
Land Area (sq/km)	92,896
2002 Gross Domestic Product (millions of US$)	204,946

Pennsylvania



	tonnes
On-site Releases	46,665
Off-site Releases	24,953
Transfers to Recycling	65,838
Other Transfers for Further Management	14,325
Total Reported Amounts of Releases and Transfers	151,780
Number of Facilities	1,312
2002 Population (000)	13,329
Land Area (sq/km)	116,075
2002 Gross Domestic Product (millions of US$)	428,950

Note: Canada and US data only. Mexico data not available for 2002. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings are meant to imply that a facility, state or province is not meeting its legal requirements. The data do not predict levels of exposure of the public to those chemicals.

States and Provinces with the Largest Amounts in North America in 2002

In 2002, the jurisdictions with the largest total releases and transfers of the matched chemicals were Texas, Ontario, Ohio, Michigan, Indiana, and Pennsylvania, each reporting more than 150,000 tonnes. These six jurisdictions were responsible for 37 percent of all releases and transfers of chemicals in North America in 2002 and almost one-third (32 percent) of all releases on- and off-site (Figure 4 and **Chapter 4**, Table 4–2).

Facilities in Texas released and transferred the largest amounts. Texas facilities also reported the largest amounts of chemicals injected underground and discharged to surface waters at facility sites of any jurisdiction in North America. Ontario facilities had the largest transfers to recycling. Ohio had the largest on-site air releases, mainly from electric utilities. Michigan had the largest other off-site transfers for further waste management, particularly transfers to energy recovery. Indiana facilities reported releasing the largest amount off-site in North America, mainly transfers of metals to disposal. Pennsylvania had the third-largest off-site releases, also mainly transfers of metals to disposal.

Arizona had the largest on-site releases in 2002, with 129.5 thousand tonnes, due to reporting by one primary metals facility that reported 111.2 thousand tonnes, primarily as on-site land disposal of copper and manganese compounds. The facility reported that it had a one-time amount of on-site land disposal due to discontinued operations related to mining. Texas and Ohio had the second- and third-largest amounts of on-site releases—each reporting more than 80,000 tonnes. These three jurisdictions were responsible for almost one-quarter (24 percent) of all on-site releases of chemicals in North America in 2002 (**Chapter 5**, Table 5–2).

Facilities Reporting the Largest Releases

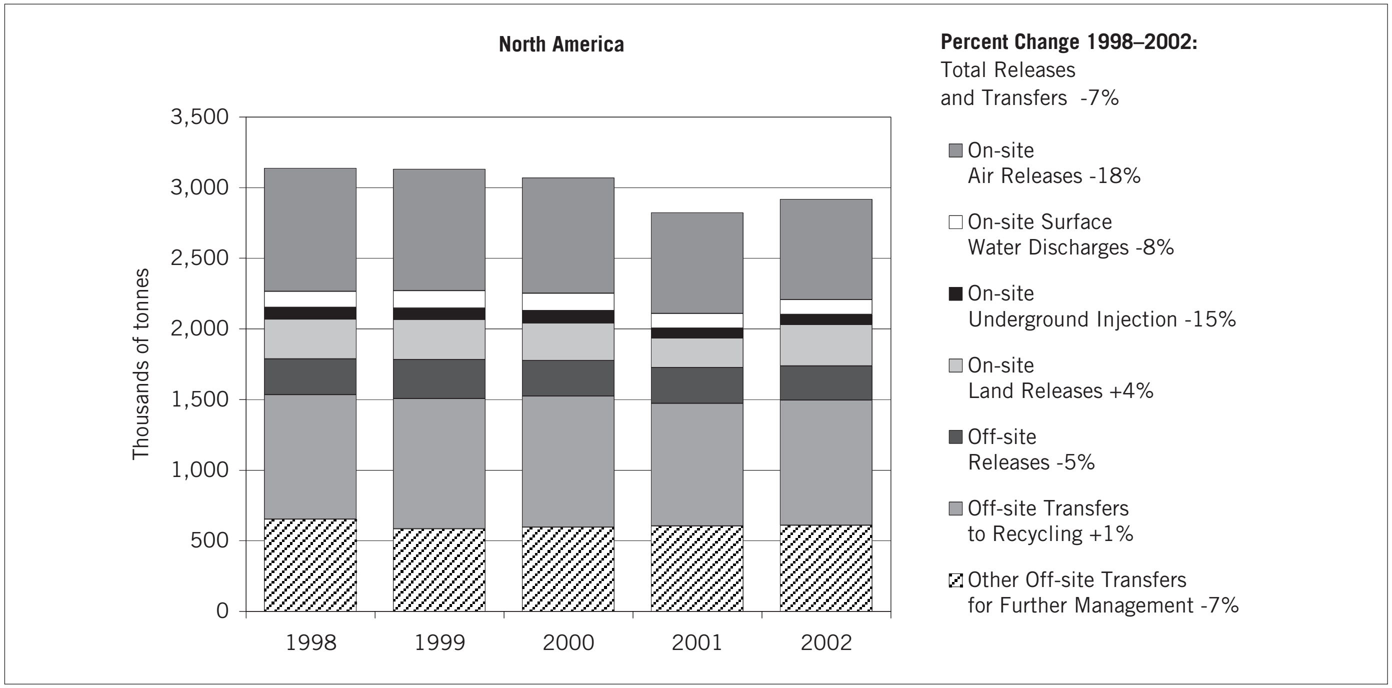
In North America, a relatively small number of facilities account for a large proportion of releases. The 20 facilities with the largest total releases (on- and off-site) accounted for 20 percent of total releases reported in 2002 (Table 1). Nineteen of the 20 facilities were located in the United States. Ten were primary metals facilities, five were electric utilities, three were chemical manufacturers and two were hazardous waste management/ solvent recovery facilities. (See **Chapter 5**, Table 5–5 for additional top facilities.)

Table 1. The 20 North American Facilities with the Largest Total Reported Amounts of Releases On- and Off-site, 2002

Rank	Facility	City, Province/State	SIC Codes Canada	SIC Codes US	Number of Forms	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total On-site and Off-site Releases Reported (kg)	Major Chemicals Reported (Primary Media/ Transfers) (chemicals accounting for more than 70% of total reported releases from the facility)
1	BHP Copper N.A., San Manuel Ops.	San Manuel, AZ		33	7	111,224,621	1,043	111,225,664	Copper/Manganese and compounds (land)
2	ASARCO Inc., Ray Complex Hayden Smelter & Concentrator, Americas Mining Corp.	Hayden, AZ		33	12	15,586,734	1,303	15,588,037	Copper/Zinc and compounds (land)
3	US Ecology Idaho Inc., American Ecology Corp.	Grand View, ID		495/738	15	12,688,715	0	12,688,715	Zinc and compounds (land)
4	National Steel Corp. Greatlakes Ops.	Ecorse, MI		33	23	124,017	12,492,672	12,616,689	Zinc and compounds (transfers of metals)
5	Nucor Steel, Nucor Corp.	Crawfordsville, IN		33	11	17,629	12,375,940	12,393,569	Zinc and compounds (transfers of metals)
6	Zinc Corp. of America, Monaca Smelter, Horsehead Inds.	Monaca, PA		33	12	437,669	11,731,187	12,168,856	Zinc and compounds (transfers of metals)
7	Solutia Inc.	Cantonment, FL		28	22	11,411,311	1,562	11,412,873	Nitric acid and nitrate compounds (UIJ)
8	Steel Dynamics Inc.	Butler, IN		33	16	275,571	10,420,512	10,696,082	Zinc and compounds (transfers of metals)
9	AK Steel Corp. (Rockport Works)	Rockport, IN		33	8	10,291,162	223,265	10,514,427	Nitric acid and nitrate compounds (water)
10	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	17	10,096,046	4,339	10,100,384	Copper/Zinc and compounds (land)
11	Georgia Power, Bowen Steam Electric Generating Plant, Southern Co.	Cartersville, GA		491/493	14	9,760,636	2	9,760,638	Hydrochloric acid (air)
12	Peoria Disposal Co. 1, Coulter Cos. Inc.	Peoria, IL		495/738	7	9,287,268	5	9,287,273	Zinc and compounds (land)
13	American Electric Power, Amos Plant	Winfield, WV		491/493	13	8,344,553	434,273	8,778,826	Hydrochloric acid (air)
14	Lenzing Fibers Corp.	Lowland, TN		28	10	8,417,073	0	8,417,073	Carbon disulfide (air)
15	BASF Corp.	Freeport, TX		28	27	8,157,457	19,233	8,176,690	Nitric acid and nitrate compounds (water)
16	Rouge Steel Co., Rouge Inds. Inc.	Dearborn, MI		33	11	33,573	8,095,377	8,128,950	Zinc and compounds (transfers of metals)
17	Ontario Power Generation Inc, Nanticoke Generating Station	Nanticoke, ON	49	491/493	15	7,983,133	0	7,983,133	Hydrochloric acid (air)
18	US TVA Johnsonville Fossil Plant	New Johnsonville, TN		491/493	14	7,802,074	5,422	7,807,496	Hydrochloric acid (air)
19	Nucor Steel, Nucor Corp.	Huger, SC		33	9	22,946	7,743,059	7,766,005	Zinc and compounds (transfers of metals)
20	Reliant Energy, Keystone Power Plant	Shelocta, PA		491/493	12	7,688,282	2	7,688,284	Hydrochloric acid (air)
	Subtotal				**275**	**239,650,469**	**63,549,195**	**303,199,665**	
	% of Total				**0.3**	**19**	**24**	**20**	
	Total				**84,654**	**1,273,863,312**	**269,421,125**	**1,543,284,437**	

Note: Canada and US only. Mexico data not available for 2002. The data are estimates of releases and transfers of chemicals as reported by facilities and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.
UIJ = underground injection.

Figure 5. Change in Releases and Transfers in North America, 1998–2002



Note: Canada and US data only. Mexico data not available for 1998–2002. Data include 153 chemicals common to both NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data, in combination with other information, can be used as a starting point in evaluating exposures that may result from releases and other management activities which involve these chemicals.

Changes Over Time, 1998–2002

Taking Stock presents analyses of changes in releases and transfers over time. The data in this section have been consistently reported over the 1998–2002 period and include:

- 153 chemicals; and
- manufacturing facilities, electric utilities, hazardous waste management facilities, chemical wholesalers, and coal mines.

These data are therefore a subset of the 2002 data presented earlier. Analyses of 1998–2002 data are presented in **Chapter 6**.

Changes in Releases and Transfers from 1998 to 2002

Total releases and transfers of chemicals in North America decreased by 7 percent from 1998 to 2002. Total releases decreased by 11 percent, on-site releases decreased by 13 percent, off-site releases decreased by 5 percent and other transfers for further management decreased by 7 percent. Transfers to recycling increased by 1 percent over the same period (Figure 5 and Chapter 6, Table 6–1).

Compared with a decrease in total releases of 11 percent for all matched chemicals from 1998 to 2002, releases of carcinogens decreased by 26 percent and chemicals known to cause cancer, reproductive or development harm (California Proposition 65 chemicals) decreased by 31 percent. (See Chapter 9, Figures 9–2 and 9–5.)

There was an increase from 2001 to 2002 of 95.3 thousand tones for all matched chemicals, including increases in on-site land releases (primarily due to one facility's reports), transfers to recycling of metals (of 3 percent), transfers to treatment (5 percent) and transfers to sewage (3 percent). One primary metals facility that reported an increase of 110.5 thousand tonnes, primarily as on-site land disposal of copper and manganese compounds, from 2001 to 2002. The facility reported that it had a one-time amount of on-site land disposal due to discontinued operations related to mining. Without reporting by this one facility, total releases and transfers showed a decrease of 1 percent from 2001 to 2002.

Industry Sectors Changes from 1998 to 2002

The industry sectors with the largest total releases and transfers in both 1998 and 2002 were:

- primary metals, with an increase of 7 percent,
- chemicals and electric utilities, each reporting an approximately 7-percent decrease; and
- the hazardous waste management/ solvent recovery sector, with a 31-percent reduction.

Four industry sectors reported overall increases in total releases from 1998 to 2002. The primary metals sector had an increase of 10 percent (33.3 thousand tonnes) due to reporting by one facility with an increase of 108.9 thousand tonnes. The food products industry had a 49-percent increase (of 14.8 thousand tonnes). The lumber and wood products sector and the stone/clay/ glass sector each reported a 12-percent increase (of more than 1.5 thousand tonnes). (See **Chapter 6**, Table 6–3.)

States and Provinces with Largest Change in Releases and Transfers from 1998 to 2002

The states and provinces with the largest decreases from 1998 to 2002 were (see **Chapter 6**, Table 6–2):

- Ohio, with a decrease of 75,100 tonnes (28 percent) in releases and transfers. Ohio had the largest total releases and transfers in 1998 and the third-largest in 2002, behind Texas and Ontario. Ohio also had the largest decreases in total reported releases, with a reduction of 37,800 tonnes, or 28 percent. One hazardous waste management facility, Envirosafe Services of Ohio, in Oregon, Ohio, reported a reduction of more than 15,100 tonnes, mainly in on-site land releases.
- Michigan, with a decrease of 31,200 tonnes (14 percent) in releases and transfers, including a decrease of 13,200 tonnes of transfers to recycling and 18,700 tonnes of other transfers for further management.
- Utah, with a decrease of 25,300 tonnes, including the second-largest decrease in total releases behind Ohio. One facility, Magnesium Corp. of America in Rowley, Utah, reported a reduction of 19,500 tonnes, primarily of chlorine air releases.

The states and provinces with the largest increases from 1998 to 2002 were (see **Chapter 6**, Table 6–2):

- Arizona, with an increase of 88,400 tonnes (191 percent), due to an increase reported by one primary metals facility, BHP Copper in San Manuel, Arizona, which had a one-time amount of on-site land disposal due to discontinued operations related to mining.
- Arkansas, with an increase of 17,600 tonnes (40 percent) in total releases and transfers, mainly in other transfers for further management (transfers to energy recovery). Total releases in Arkansas decreased by 5,900 tonnes.
- Kansas, with an increase of 11,600 tonnes (41 percent) in total releases and transfers. Kansas had an increase in transfers for further management of 22,400 tonnes, but total releases decreased by 6,900 tonnes.
- Indiana reported the second-largest increase in total releases, with an increase of 11,500 tonnes (15 percent). One primary metals facility, AK Steel in Rockport, Indiana, did not report in 1998 and reported 9,700 tonnes of releases in 2002, mainly surface water discharges of nitrate compounds.
- British Columbia reported the third-largest increase in total releases—8,100 tonnes (127 percent). Four pulp and paper mills in British Columbia were among the ten facilities in NPRI with the largest increases in total releases. These facilities indicated that the increases were due to improved estimates and production increases.

Query Builder

http://www.cec.org/takingstock/

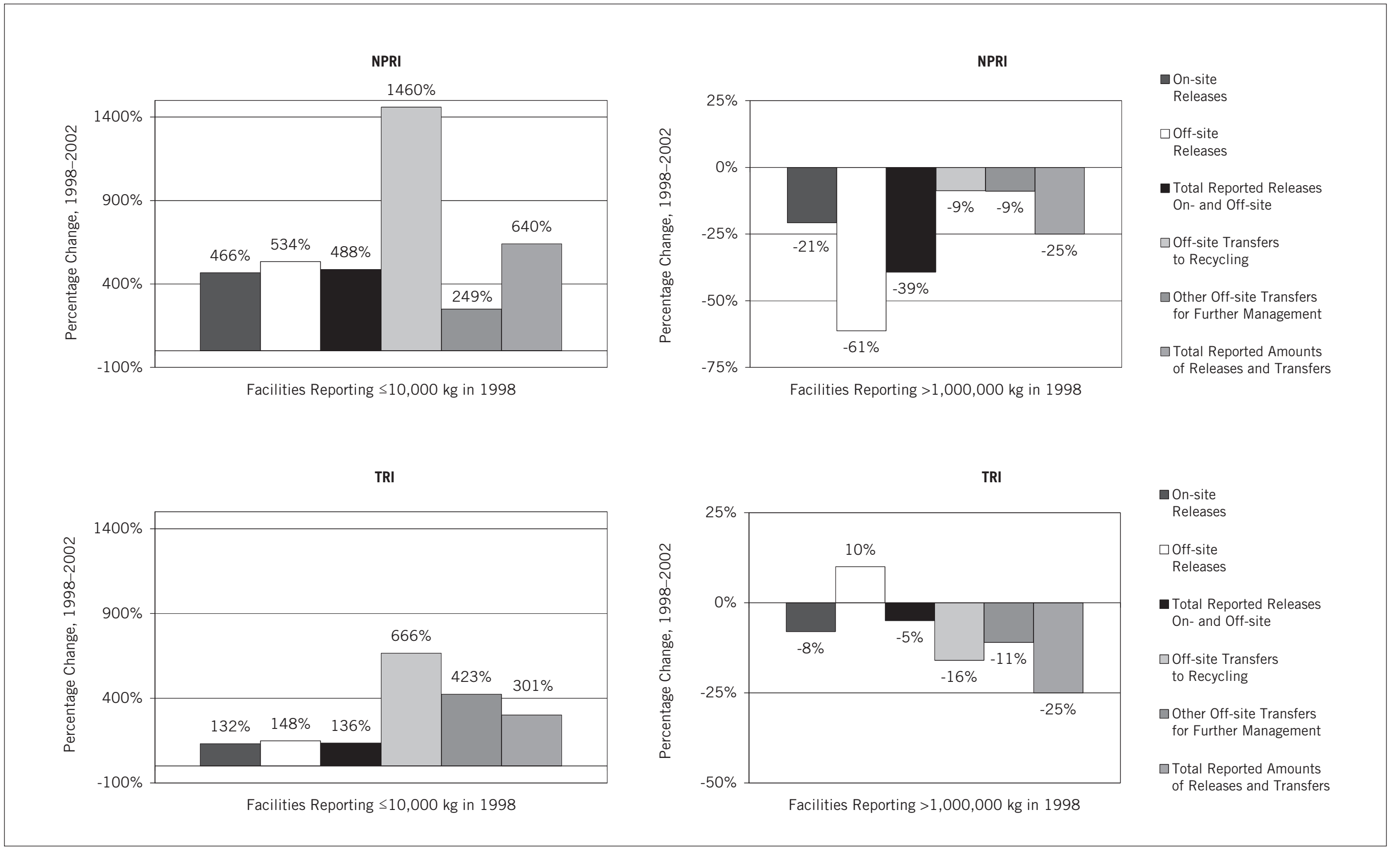
To find out which facilities had the largest amounts in your provice or state using *Taking Stock Online*:

1. select **Facility** report.
2. select the **year 2002**.
3. select **Your Province or State** for the geographic area,
   select **All** for the chemical,
   select **All industries** for the industrial sector.
4. select **Total releases**.

Then click on ✓ Run the query

Then go to the column titled "Total Releases" and click on the **up arrow** to get the 10 facilities with the largest amounts.

Figure 6. Percentage Change in Total Reported Amounts of Releases and Transfers in NPRI and TRI, by Facilities Reporting in Both Years, 1998 and 2002



Note: Does not include facilities reporting only in 1998 or only in 2002 and does not include 31 facilities that reported less than 100,000 kg in 1998 and more than 1,000,000 kg in 2002.

Top-Reporting Facilities Reported Decreases while others Showed Overall Increases

The overall changes in releases and transfers within a jurisdiction, nation or sector are often dominated by changes in the group of facilities reporting the largest releases and transfers. However, the facilities reporting smaller releases and transfers also tell an important story. These much more numerous facilities, located in communities throughout Canada and the United States, are increasing in every category: on-site releases, off-site releases and transfers.

There were 615 facilities that reported 1,000 tonnes or more of releases and transfers in 1998. This group of largest reporters released and transferred over 1.7 million tonnes in 1998 and had an overall reduction of 10 percent from 1998 to 2002. The group of largest reporters represented over half of the releases and transfers in 2002 but just 4 percent of the facilities reporting in both 1998 and 2002 (Figure 6 and **Chapter 6,** Tables 6–9, 6–10 and 6–11).

In contrast, the 7,400 facilities reporting less than 10 tonnes in 1998 showed remarkably different patterns over the period from 1998 to 2002. While the group of largest reporters reported an overall decrease in their releases and transfers, the group of smaller reporters reported an overall increase of 323 percent, including substantial increases in all categories of releases and transfers, from 1998 to 2002.[1] For the remaining facilities, those with more than 10 tonnes but less than 100 tonnes also reported an overall increase (of 16 percent) although on-site releases for these facilities as a whole decreased (by 1 percent), and those with more than 100 tonnes but less than 1,000 tonnes reported on overall decrease (of 8 percent).

The overall pattern of increases for the smaller reporters and decreases for the largest reporters was true for both NPRI and TRI. However, there were notable differences between NPRI and TRI industry sectors within the groups.

For the NPRI group of smaller reporters, the paper products sector represented 39 percent of total releases for the group in 2002 and increased from 45 tonnes in 1998 to 1,500 tonnes in 2002. Some facilities in the paper industry in NPRI indicated that they changed their method of estimating releases, resulting in increased estimates, as well as increased production. (Generally, TRI paper facilities had made a similar change in their method of estimation during the 1994 reporting year.)

For the TRI group of smaller reporters, the food industry had the largest total releases in 2002, representing 21 percent of the total for the group. Their releases were almost 20-times larger in 2002 than in 1998. Ten TRI facilities in this group had increases greater than 175 tonnes, primarily in discharges of nitric acid and nitrate compounds to surface waters.

[1] This does not include 20 facilities reporting less than 100 tonnes in 1998 and greater than 1,000 tonnes in 2002.

Changes in Cross-Border Transfers from 1998 to 2002

Chemicals may be transferred off-site for disposal, treatment, energy recovery, or recycling. Most materials are transferred to sites within state and national boundaries. However, each year, some materials are sent outside the country.

Cross-border transfers from Canada to the United States increased by 25 percent from 1998 to 2002. Most transfers to the United States are of metals for recycling. (See Map 1 and Chapter 8, Table 8–11 and Figure 8-6.) Total transfers within Canada increased by 5 percent.

Cross-border transfers from the United States to Canada decreased by 44 percent from 1998 to 2002. Such transfers vary considerably from year to year, with some years (including 1998) totaling about 25,000 tonnes and other years (including 2002) about 14,000 tonnes. From 2001 to 2002, transfers from the United States to Canada decreased by 43 percent (10,900 tonnes), mainly due to the decrease reported by one hazardous waste facility, Petro-Chem Processing Group/Solvent Distillers Group in Detroit, Michigan, which reported 11,000 tonnes fewer transfers to energy recovery in 2001 than in 2002.

Transfers from the United States to Mexico increased by 48 percent from 1998 to 2002. More than 99 percent of such transfers are of metals for recycling. There was an increase of 15 percent from 2001 to 2002, after a decrease from 2000 to 2001. Canadian facilities did not report any transfers to Mexico. Data on the amount of transfers from Mexico to the United States are not available for the years 1998–2002.

The changes in cross-border transfers are largely a result of changes at a few facilities. Facilities in primary and fabricated metals sectors often change their transfer sites due to changes in metal prices offered by recyclers. Facilities in the hazardous waste sector have changed their transfer sites as a result of business consolidation, price or changes in services offered.

Map 1. Off-site Transfers Across North America, 1998–2002 (Amounts in Thousand Tonnes)

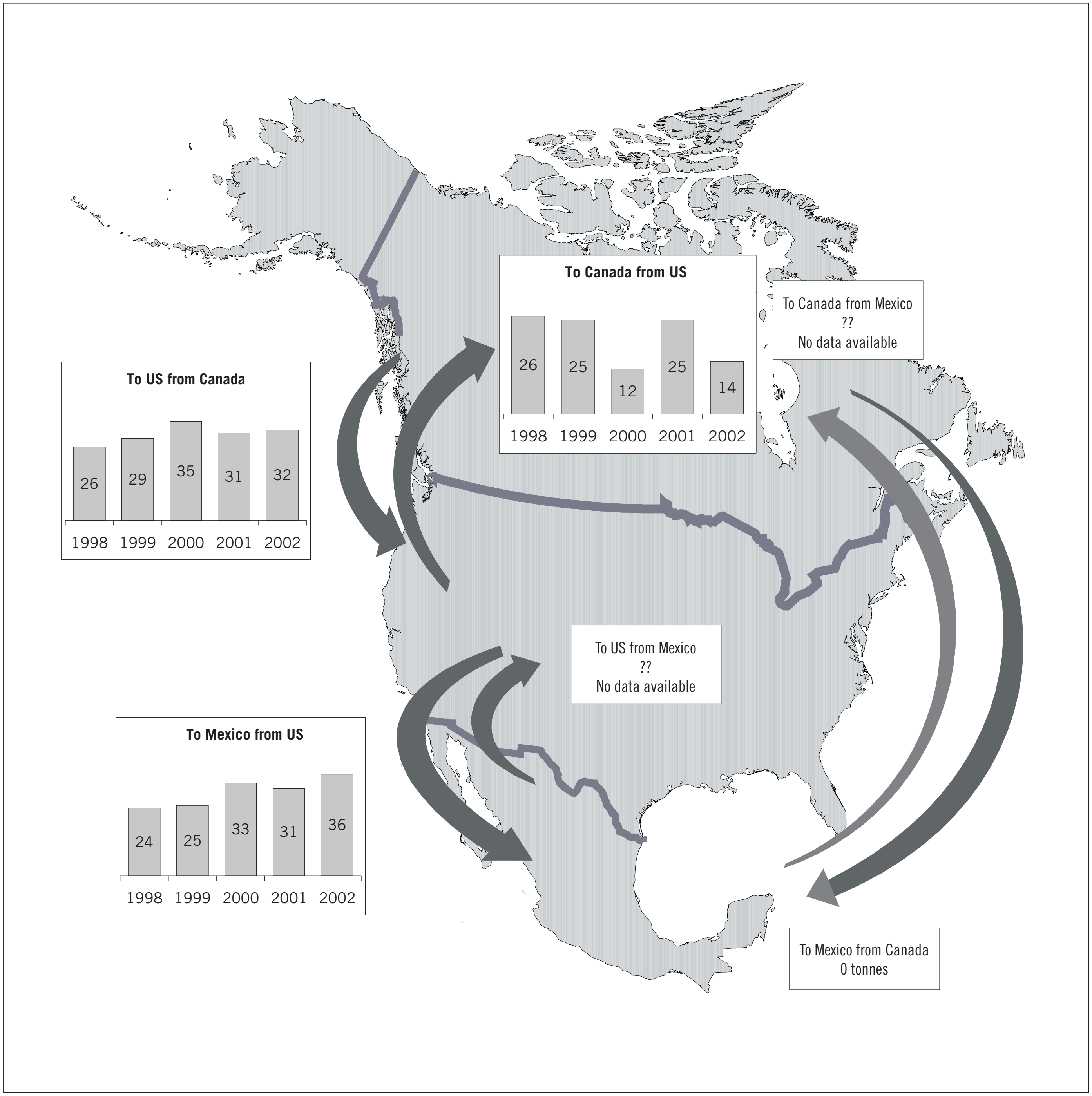
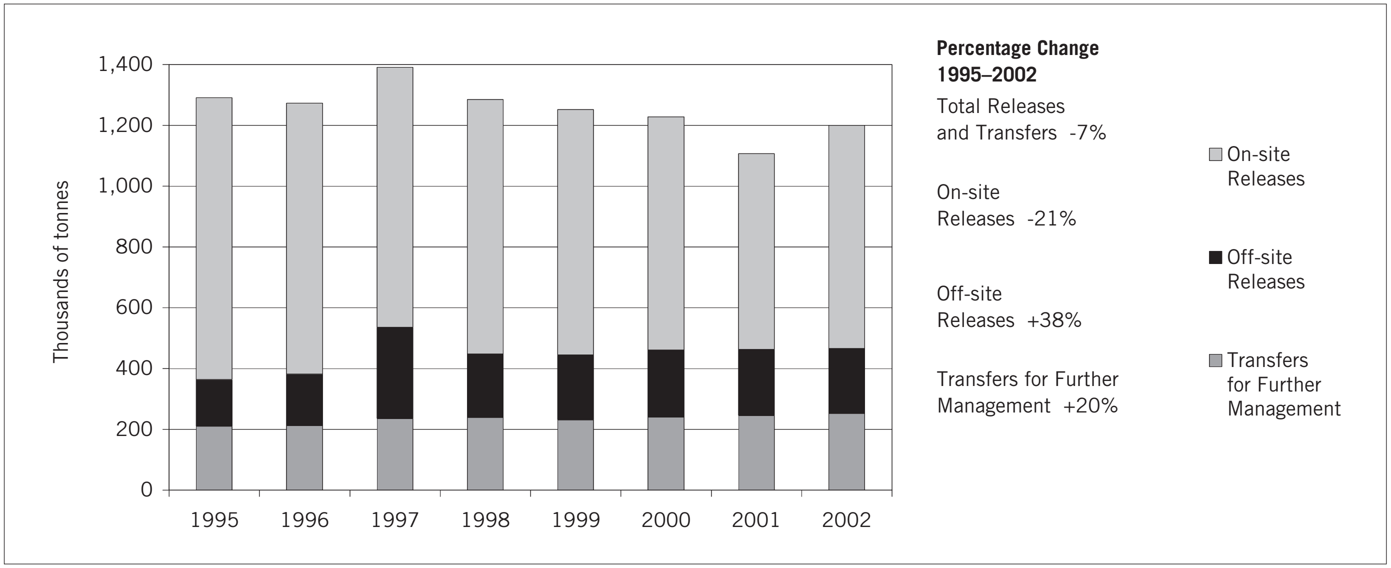


Figure 7. Total Releases and Transfers in North America, 1995–2002



Note: Canada and US only. Mexico data not available for 1995–2002.

Eight-Year Trends: 1995–2002 Results

Taking Stock 2002 can analyze trends in releases and transfers of chemicals in North America over the period from 1995 to 2002. The data in this section have been consistently reported over these eight years and include:

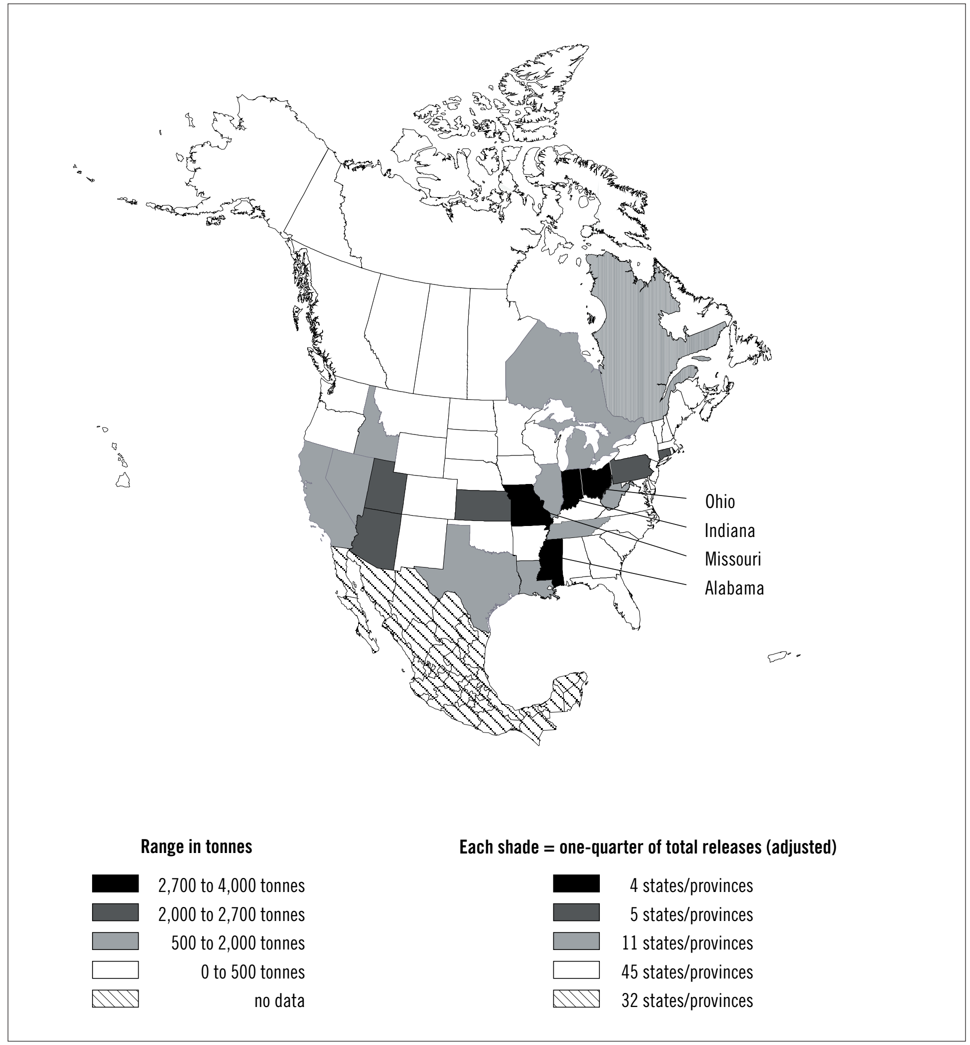
- 153 chemicals,
- manufacturing industries, and
- on- and off-site releases and transfers to treatment and sewage.

Analyses of the 1995–2002 trends are presented in **Chapter 7**.

Over the eight-year period from 1995 to 2002, total releases and transfers decreased by 7 percent, including a decrease of 9 percent for NPRI and 7 percent for TRI. On-site releases decreased by 21 percent, with a 15-percent decrease reported by NPRI facilities and a 21-percent decrease by TRI facilities. Off-site releases (transfers to disposal, mainly to landfills) decreased by 14 percent in NPRI; however, they increased by 49 percent in TRI, for a North American total increase of 38 percent. Transfers off-site for further management increased in both countries, with NPRI showing a 70-percent increase and TRI an 18-percent increase (Figure 7 and **Chapter 7**, Table 7–1 and Figures 7-2 and 7-3).

Most manufacturing industry sectors reported overall decreases. Chemical manufacturers reported the largest releases and transfers in 1995 and, with an 18-percent reduction, had the second-largest in 2002. The primary metals sector, with the second-largest total releases and transfers in 1995 had a 36-percent increase and the largest totals in 2002. The paper products sector had the third-largest totals in both 1995 and 2002, with a 22-percent reduction. (See **Chapter 7**, Table 7–3.)

Map 2. Largest Sources of Total Releases On-site and Off-site (adjusted) of Lead and its Compounds in North America, 2002: States and Provinces



Persistent Bioaccumlative Toxic Chemicals

Many persistent bioaccumulative toxic (PBT) chemicals were required to be reported to the North American PRTRs for the first time in 2000. These chemicals have properties that make them a long term environmental and health threat. Even small quantities are a concern because when PBTs are released into the environment, they persist (i.e., they do not break down easily into other compounds), meaning their exposure to humans and the environment can potentially occur over longer periods of time than with other chemicals. They can be transported in the atmosphere over long distances and end up far from the source of their release. They bioaccumulate in the food chain (increasing in concentration at higher levels), so exposure to these chemicals may arise through food consumption. They are also toxic, often causing damage to humans, plants and wildlife.

Because of reporting differences, PBT chemicals are generally not in the matched data set. Nevertheless, **Chapter 10** presents information available for lead, mercury, dioxins and furans, hexachlorobenzene, and polycyclic aromatic compounds. The implications of the reporting differences are presented as part of the continuing effort to enhance the comparability of the data.

Lead and its Compounds

Lead is a persistent, bioaccumulative toxic chemical. It is a probable human carcinogen and a recognized developmental toxicant and recognized reproductive toxicant (California Proposition 65). Lead is considered a hazardous air pollutant under the US Clean Air Act and a Priority Pollutant under the US Clean Water Act. Lead and its compounds are considered toxic under the Canadian Environmental Protection Act.

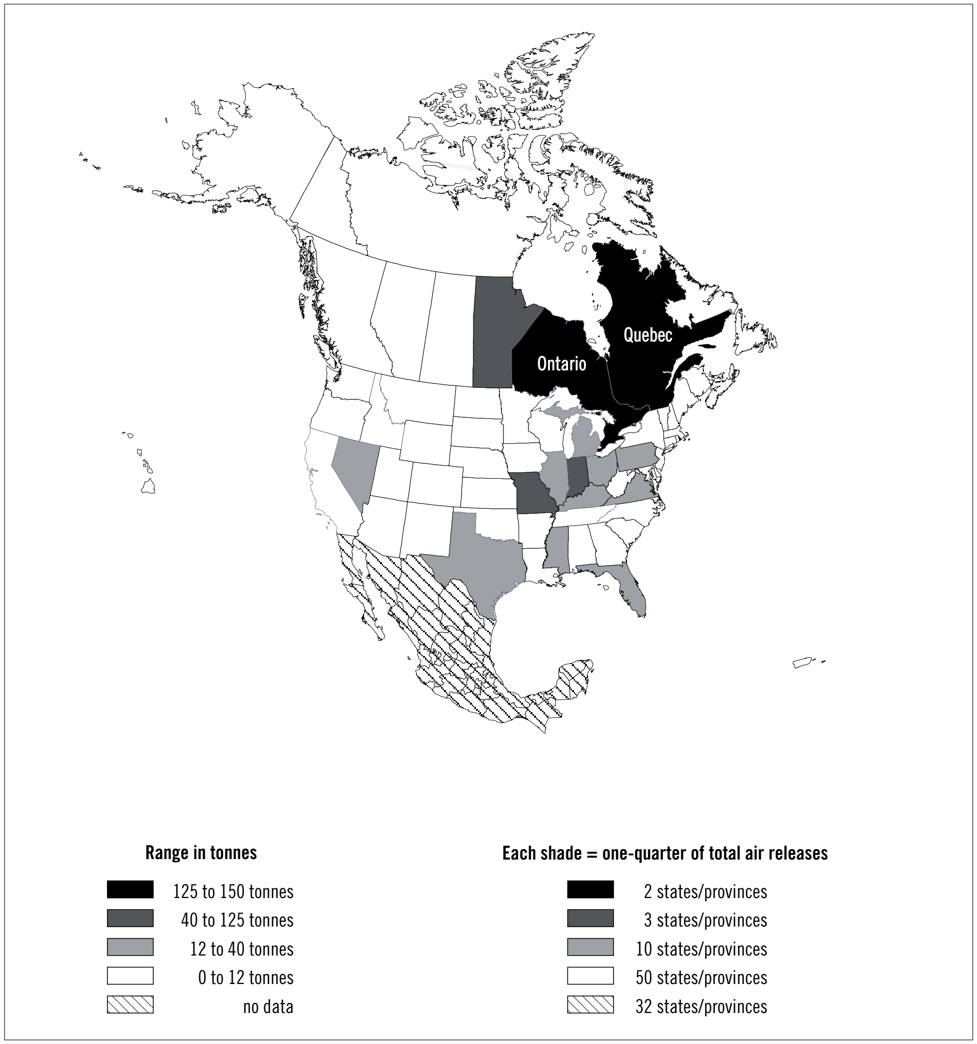
Children are especially sensitive to lead. It can damage a child's developing brain, kidneys and reproductive system. Even low levels of lead are associated with learning disabilities, behavioral problems, impaired growth and hearing loss. Lead is stored in the bones, where it accumulates over time and remains for long periods. Therefore, mothers exposed to lead in the past may have higher levels of lead in their bones, which can cause impaired mental development in their infants. Effects of lead can also be irreversible, affecting IQ and school achievement.

Both TRI and NPRI have lowered the reporting threshold for lead and its compounds, TRI for the 2001 reporting year and NPRI for the 2002 reporting year. The threshold was lowered from approximately 10 tonnes to approximately 50 kg, giving a more complete picture of releases and transfers of lead from industrial sources.

Lead is a metal primarily produced by the mining and smelting of ores and secondarily through recycling. Lead is found in a wide variety of products: lead acid batteries used in vehicles, pigments, plastics, glass, electronics, plumbing, cigarettes, ammunition and consumer products such as jewelry and pottery.

Most of the lead in the environment is from air emissions. Larger lead-bearing particles can fall out of the air close to the source of release, or if the lead is bound to

Map 3. Largest Sources of On-site Air Releases of Lead and its Compounds in North America, 2002: States and Provinces



very fine particles, it can travel thousands of miles from its source and be deposited onto the ground or water by dry fallout, or be precipitated by rain, snow or fog. Lead levels can be high due to local sources, such as deteriorating lead-based paint, lead contaminated dust, drinking water passing through leaded pipes, cigarette smoke, clothes and materials contaminated from working in a plant using lead such as metal processing plants, battery manufacturers, and electronics plants, as well as from long range transport.

Based on the matched TRI and NPRI data, 8,703 industrial facilities in North America reported on lead in 2002. Over three-quarters of these facilities had not reported on lead and its compounds in 2000, under the higher threshold.

Almost 211,200 tonnes of releases and transfers of lead and its compounds were reported in 2002, including 961 tonnes in on-site air releases and 67 tonnes in on-site surface water discharges. More than three-quarters of total reported amounts of lead and its compounds was transferred for recycling. Primary metals facilities reported 39 percent of total releases, including 66 percent of the air releases and 19 percent of the surface water discharges. Hazardous waste management facilities reported 33 percent of total releases, including 38 percent of on-site land releases. Electric utilities reported 13 percent of air releases and 26 percent of surface water discharges. (See **Chapter 10**, Table 10–3.)

TRI and NPRI had different patterns for lead releases. While NPRI represented 5 percent of facilities reporting lead and its compounds, they accounted for 42 percent of the on-site air releases. Three NPRI facilities—Hudson Bay Mining and Smelting Company in Flin Flon, Manitoba, Noranda Horne Smelter in Rouyn-Noranda, Quebec and Inco Limited, Copper Cliff Smelter Complex in Copper Cliff, Ontario—reported the largest air releases of lead and its compounds in 2002, together accounting for 30 percent of all air releases (almost 291 tonnes). On the other hand, of the ten facilities with the largest surface water releases, nine were TRI facilities. They included Kennedy Valve, owned by McWane Inc. in Elmira, New York, which accounted for 10 percent (almost 7 tonnes) of the total surface water discharges, and PCS Nitrogen Fertilizer in Geismar, Louisiana, with 7 percent (almost 5 tonnes) of the total. Six electric utilities, all located in the US, were among the ten facilities with the largest surface water discharges of lead and its compounds in 2002. Some of these facilities were located in the states and provinces with the largest total releases and largest air releases in 2002. (See Maps 2 and 3 and **Chapter 10**, Tables 10-2, 10-5 and 10-6.)

Transfers of lead and its compounds for recycling accounted for 77 percent of total releases and transfers in 2002. The electronic/electrical equipment manufacturing sector reported the largest portion, with 55 percent of all transfers to recycling from this sector and about 1 percent of the total releases in 2002. (See **Chapter 10**, Table 10-8.)

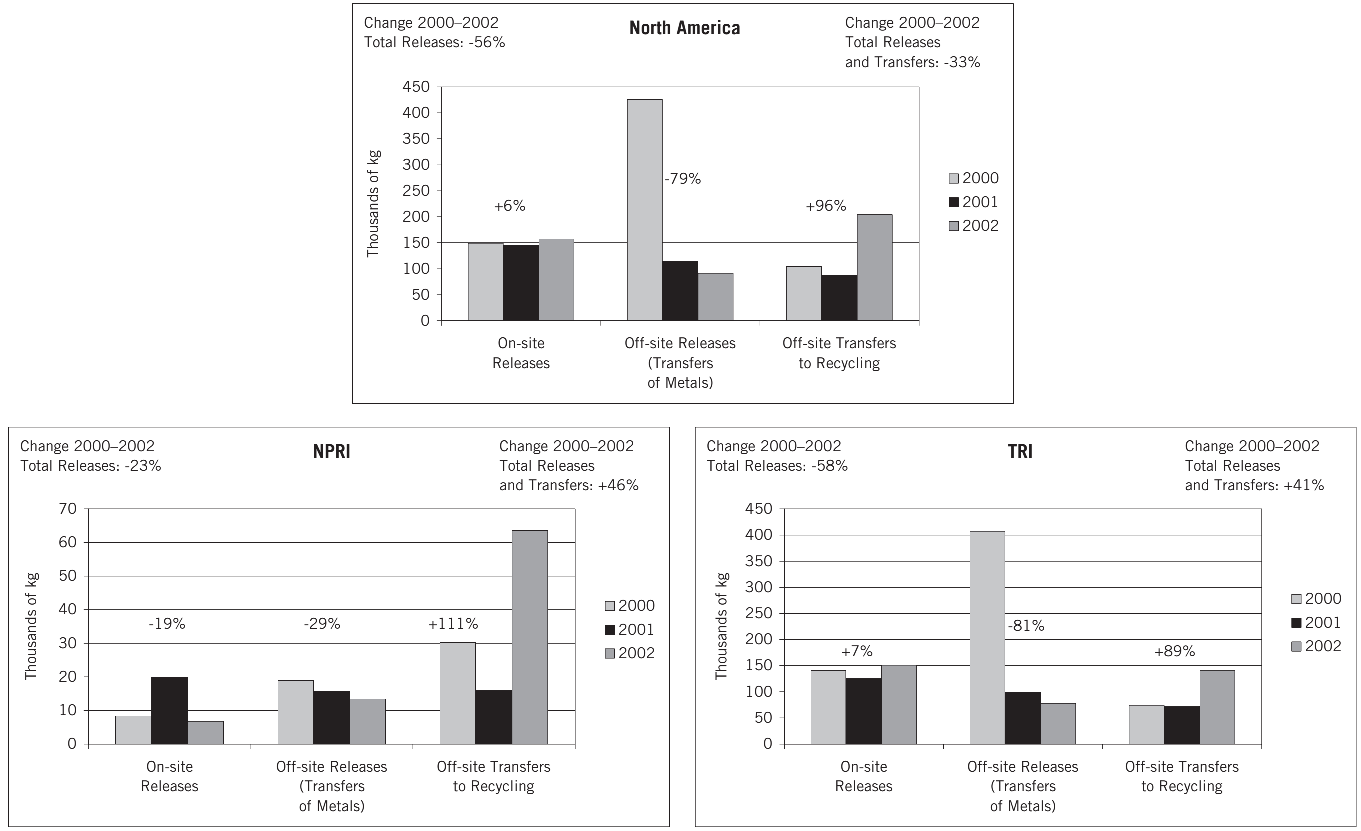
Mercury and its Compounds

Mercury can cause neurological and developmental damage, especially in children. A major pathway of human exposure to mercury is through the food chain. Mercury in the air is deposited in water or runs off the land into water. It bioaccumulates in fish, and humans are exposed through their consumption of fish, shellfish and marine mammals.

Both TRI and NPRI lowered the reporting threshold for mercury and its compounds for the 2000 reporting year. Based on the matched TRI and NPRI data, 1,787 facilities in North America reported almost 453,300 kg of releases and transfers of mercury and its compounds in 2002, including 65,900 kg in on-site air releases and 608 kg in on-site surface water discharges. Electric utilities reported 65 percent of the air releases and 38 percent of the surface water discharges. Hazardous waste management facilities reported 40 percent of total releases and transfers, including 26 percent of on-site land releases and 53 percent of transfers to recycling. (See **Chapter 10**, Tables 10–16 and 10–18.)

Total releases of mercury and its compounds decreased by 56 percent from 2000 to 2002, including a 10-percent reduction in on-site air releases and a 48-percent reduction in on-site surface water discharges. TRI facilities reported a decrease of 58 percent in total releases of mercury and its compounds. NPRI facilities reported a decrease of 23 percent. Both TRI and NPRI showed a decrease of 10 percent in air releases of mercury and its compounds. (See Figure 8 and **Chapter 10**, Table 10–22.)

Figure 8. Releases and Transfers in North America for Mercury and its Compounds, NPRI and TRI, 2000–2002



Note: Canada and US data only. Mexico data not available for 2000–2002.

Dioxins and Furans

Dioxin and furans are persistent, bioaccumulative toxics. They are a family of chemicals some members of which are considered to be carcinogens or suspected to be neurotoxicants, developmental toxicants and endocrine disruptors. Dioxins and furans can come from a number of sources, including incomplete combustion such as backyard burning, agricultural field burning, incineration, and industrial sources. Dioxins and furans can travel some distance from their source of release. Human exposure to dioxins and furans occurs largely through food. Dioxins and furans enter the food chain when animals eat contaminated plants or feed, or when fish consume contaminated water or food.

Dioxins and furans were required to be reported to NPRI and TRI for the first time in the 2000 reporting year. However, the reporting requirements differ so the data on dioxins and furans are not comparable.

About 5 percent of all TRI facilities reported releasing or transferring dioxins and furans in 2002. TRI facilities reported a decrease of 12 percent in total releases on- and off-site of dioxins and furans from 2000 to 2002 (in grams-iTEQ), with chemical manufacturers reporting the largest amounts in all three years. (See **Chapter 10**, Table 10–30.)

Only certain NPRI facilities must report on dioxins and furans, based on activities or processes used at the facility. About 11 percent of all NPRI facilities did so in 2002. They reported a 32-percent decrease in total releases on- and off-site from 2000 to 2002 (in grams-iTEQ), with the paper products industry reporting the largest amounts of releases in all three years. (See **Chapter 10**, Table 10–32.)

Criteria Air Contaminants

In 2002, for the first time, NPRI required reporting of air releases of a set of pollutants known as the criteria air contaminants. These pollutants are important as they contribute to environmental issues such as smog, acid rain, regional haze, and nutrient loading (eutrophication) and to health effects such as stroke, heart attack, respiratory illness, including asthma, bronchitis and emphysema, and premature mortality.

The Canadian NPRI added reporting on five criteria air contaminants for the 2002 reporting year. The United States has a preliminary draft National Emissions Inventory (NEI) for criteria air contaminants for 2002. The Mexican Annual Certificate of Operation (*Cédula de Operación Anual*—COA), Section 2, has mandatory reporting for three of the criteria air contaminants on the NPRI list for 2002.

Comparable criteria air contaminants data from Canada and the United States include data on:

- carbon monoxide,
- nitrogen oxides,
- particulate matter (PM_{10} and $PM_{2.5}$),
- sulfur dioxide, and
- volatile organic compounds.

Comparable data from all three countries include:

- nitrogen oxides,
- sulfur dioxide, and
- volatile organic compounds.

Comparable data from each of the countries' databases are selected based on the US NEI thresholds which are higher than reporting in Canada and Mexico (see **Chapter 3**, Table 3–2). For the three-country analysis, further selection is based on the industry sectors required to report to the Mexican COA (see **Chapter 3**, Table 3–3).

While these databases contain information on air releases of criteria air contaminants from industrial sources, there may be differences in methodology between them. For example, estimation methods for specific sectors may differ, threshold for reporting differ and classification of industrial sectors may differ. Also, the US data are preliminary draft data as of February 2005. However, they are the best available sources for facility specific information about criteria air contaminants in 2002.

The data are only from industrial sources. For some of the criteria air contaminants, other sources such as transportation vehicles, construction sites, open burning and agricultural activities are much larger sources than industrial facilities. This is especially true for carbon monoxide, whose major source includes motor vehicles, and particulates, whose major sources are construction sites, unpaved roads, wood burning and tilled fields.

Criteria air contaminants are emitted from a variety of sources including fuel combustion, industrial processes, vehicles (mobile sources), and agricultural activities. (See Box below.)

Industrial and combustion processes are major sources of sulfur dioxide. Mobile sources, such as cars, trucks and off-road vehicles are major sources of volatile organic compounds and, in urban areas, of carbon monoxide. Both industrial and mobile sources contribute significantly to emissions of nitrogen oxides. Direct emissions of particulate matter (called primary particulate matter) more often comes from other sources such as construction sites, unpaved roads, tilled fields, and wood burning. Sulfur dioxide, nitrogen oxides and volatile organic compounds can become secondary particulate matter, formed chemically in the atmosphere rather than emitted directly from a source. The amount of secondary particulate matter formed in the atmosphere is not included in a national inventory as they are not direct emissions.

Largest Sources of Criteria Air Contaminants

	Fuel Combustion	Industrial Sources	Mobile (Transportation) Sources	Other
Carbon monoxide			√	
Nitrogen oxides		√	√	
Particulates				√
Sulfur dioxide	√	√		
Volatile organic compounds	√	√		

Nitrogen Oxides

Nitrogen oxides (NO_X) are a group of gases that can irritate the lungs, cause bronchitis and pneumonia and increase susceptibility to respiratory infection. Nitrogen oxides are of concern because of their role in ozone, acid rain and particulate matter formation and in eutrophication. Nitrogen oxides are created during combustion. Transportation, utilities, incineration and primary metals production are large sources of NO_X.

Selection of the Canadian NPRI, Mexican COA and the US NEI data for just those industry sectors required to report to the Mexican COA and those reporting above the US NEI threshold results in data from 4,074 facilities and 9.8 million tonnes of air releases of nitrogen oxides from these industrial facilities in North America (see Figures 9 and 10 and **Chapter 3**, Table 3–7).

- United States facilities accounted for 61 percent, Mexican facilities for 34 percent and Canadian facilities for 5 percent of the total air releases of nitrogen oxides from this matched set of facilities.
- In all three countries, electric utilities reported the largest amounts of nitrogen oxides in 2002.
- In Canada, electric utilities accounted for 54 percent of nitrogen oxide air emissions, followed by oil and gas extraction facilities with 15 percent.
- In Mexico, electric utilities accounted for 61 percent, followed by oil and gas extraction facilities with 15 percent.
- In the United States, electric utilities accounted for 78 percent of nitrogen oxide air emissions, followed by stone/clay/glass and concrete manufacturers with 5 percent.

Figure 9. North American Air Releases of Criteria Air Contaminants, by Country, 2002: Nitrogen Oxides

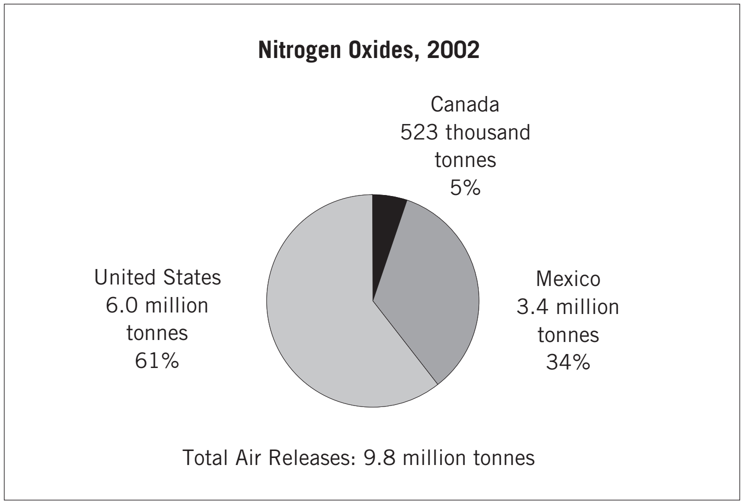
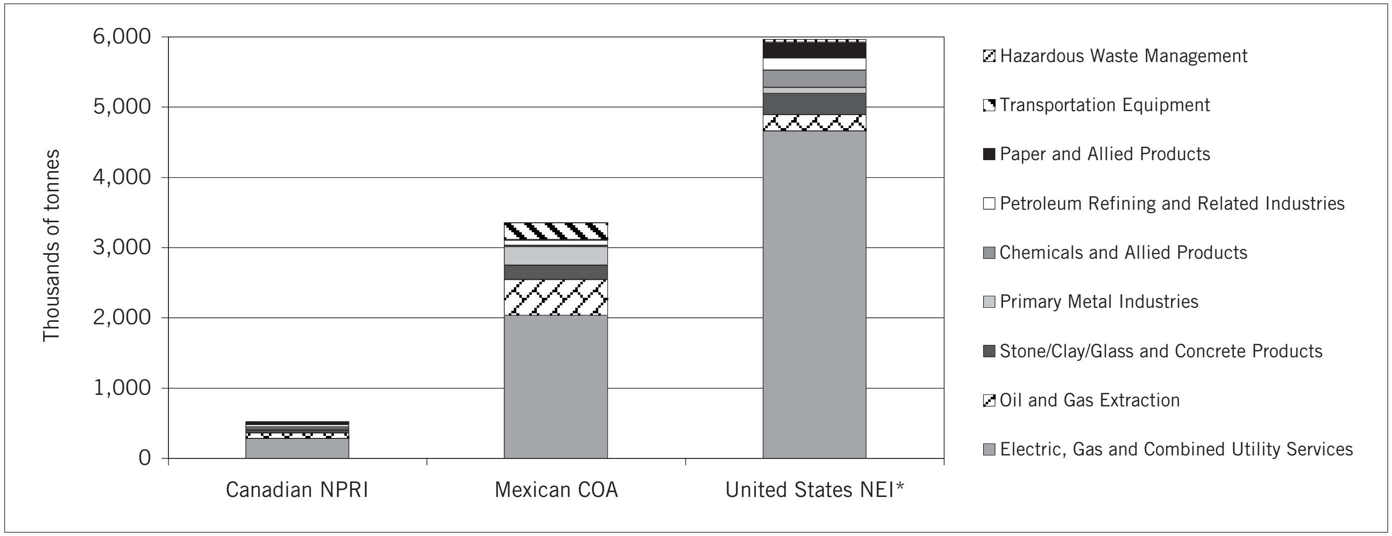


Figure 10. North American Air Releases of Criteria Air Contaminants, by Industry, 2002: Nitrogen Oxides



* Preliminary draft data from US National Emissions Inventory as of February 2005.

Figure 11. North American Air Releases of Criteria Air Contaminants, by Country, 2002: Sulfur Dioxide

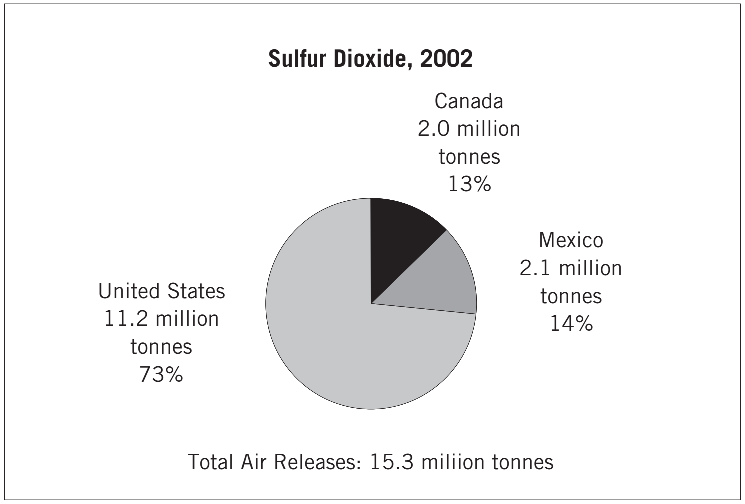
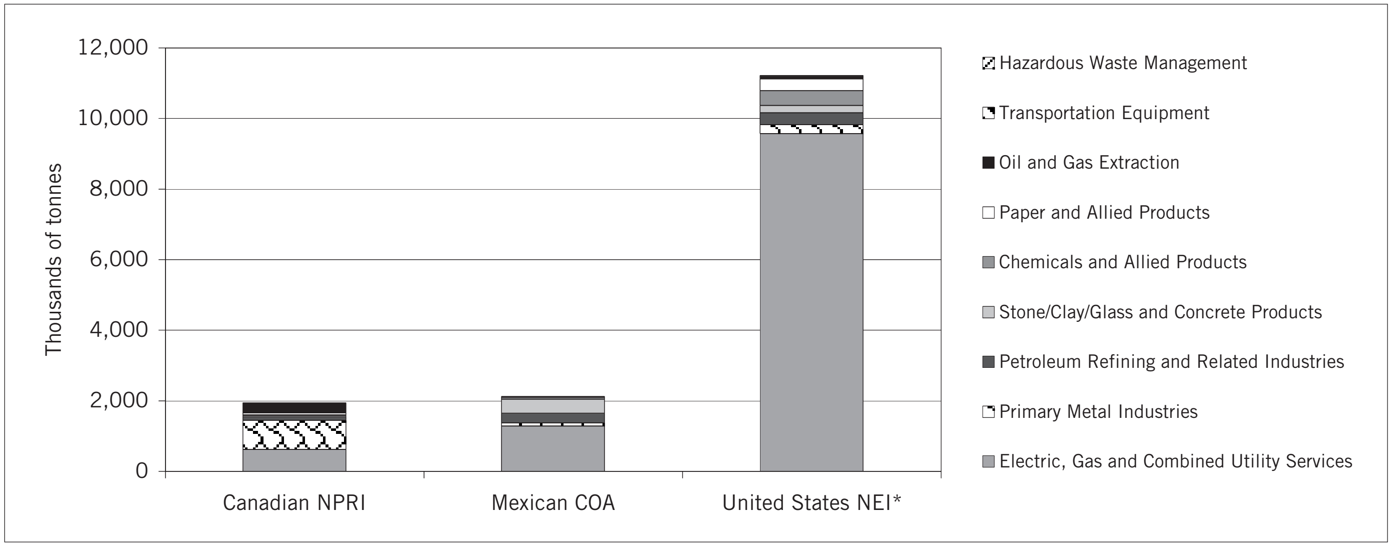


Figure 12. North American Air Releases of Criteria Air Contaminants, by Industry, 2002: Sulfur Dioxide



* Preliminary draft data from US National Emissions Inventory as of February 2005.

Sulfur Dioxide

Sulfur dioxide (SO_2) is a colorless, pungent gas, which can react with other chemicals in the atmosphere to form sulfate particles. Health effects include premature death, increased respiratory symptoms and disease, decreased lung function, and alterations in lung tissue and structure and in respiratory tract defense mechanisms.

SO_2 emissions are also a major contributor to acid deposition, commonly known as "acid rain," which can result in harm to fish and other aquatic life, forests, crops, buildings, and monuments. Fine particles formed from SO_2 emissions also are significant contributors to poor visibility at scenic panoramas across North America because the particles efficiently scatter natural light, thus creating hazy views.

Sulfur dioxide is emitted primarily from fuel combustion, followed by industrial processes such as smelters, steel mills, refineries and pulp and paper mills, and then transportation.

Selection of the Canadian NPRI, Mexican COA and the US NEI data for just those industry sectors required to report to the Mexican COA and those reporting above the US NEI threshold results in data from 2,075 facilities and 15.3 million tonnes of air releases of sulfur dioxide from these facilities in North America (see Figures 11 and 12 and **Chapter 3** Table 3-9).

- US facilities accounted for 73 percent, Mexican facilities for 14 percent and Canadian facilities for 13 percent of the total air releases of sulfur dioxide from this matched set of facilities.
- In both the United States and Mexico, electric utilities reported the largest amounts in 2002. For Canada, it was the primary metals sector that had the largest air releases of sulfur dioxide in 2002.
- In Canada, the primary metals sector accounted for 42 percent of sulfur dioxide air emissions, followed by electric utilities with 32 percent.

- In Mexico, electric utilities accounted for 60 percent, followed by stone/clay/glass and concrete manufacturers with 19 percent.
- In the United States, electric utilities accounted for 85 percent of sulfur dioxide air releases, followed by chemical manufacturers with 4 percent.

Volatile Organic Compounds (VOCs)

Volatile organic compounds are a large category of chemicals that share one characteristic, they evaporate or volatilize into the air. VOCs are one of the building blocks of ozone, a major component of smog. VOCs can also form particulates in the atmosphere. VOCs are a group of chemicals with varying environmental and health effects and they come from a wide range of sources, including vehicles, fossil fuel combustion, chemical and steel manufacturing, painting and stripping activities, petroleum refining and solvent use. There are also significant natural sources of VOCs, including transpiration from vegetation and forest fires.

Selection of the Canadian NPRI, Mexican COA and the US NEI data for just those industry sectors required to report to the Mexican COA and those reporting above the US NEI threshold results in data from 1,687 facilities and 743 thousand tonnes of air releases of volatile organic compounds from these facilities in North America (see Figures 13 and 14 and **Chapter 3** Table 3–10).

- US facilities accounted for 76 percent, Canadian facilities for 18 percent and Mexican facilities for 6 percent of the total air releases of volatile organic compounds from this matched set of industrial facilities.

The industry sectors reporting the largest amounts in the three countries differed.

- In Canada, the oil and gas extraction sector accounted for 43 percent of volatile organic compounds air emissions, followed by the paper products industry with 19 percent.
- In Mexico, chemical manufacturers accounted for 30 percent, followed by facilities making transportation

Figure 13. North American Air Releases of Criteria Air Contaminants, by Country, 2002: Volatile Organic Compounds

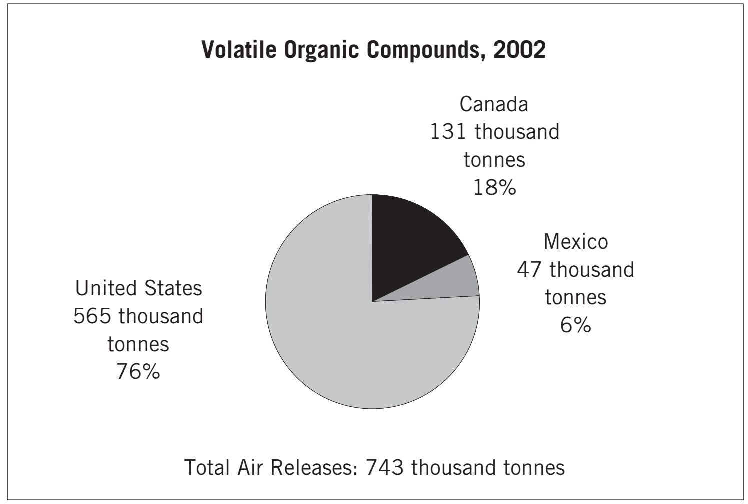
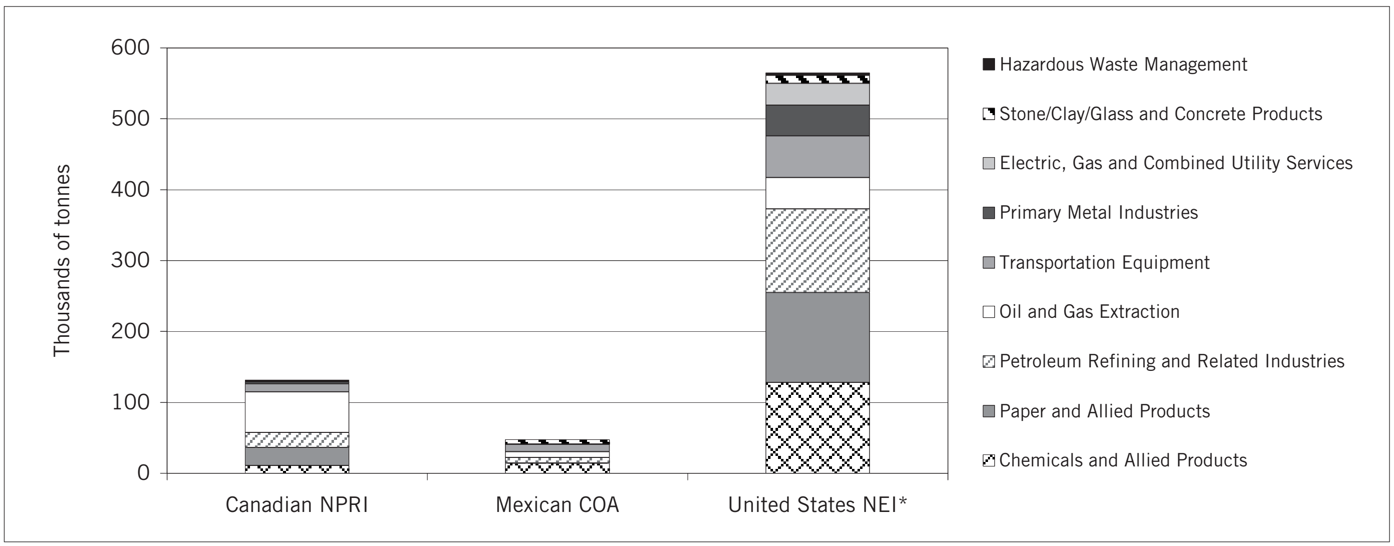


Figure 14. North American Air Releases of Criteria Air Contaminants, by Industry, 2002: Volatile Organic Compounds



* Preliminary draft data from US National Emissions Inventory as of February 2005.

equipment with 22 percent and the oil and gas extraction sector with 17 percent.

- In the United States, chemical manufacturers accounted for 23 percent of volatile organic compounds air releases, followed by the paper products industry with 22 percent and petroleum refiners with 21 percent.

Other Criteria Air Contaminants

Carbon monoxide and particulates (PM_{10} and $PM_{2.5}$) are also reported to the Canadian NPRI and can be matched to reporting under the US NEI, but not under the Mexican COA.

Carbon Monoxide

Carbon monoxide is a colorless, odorless and poisonous gas. When fuel is burned incompletely, carbon monoxide often results. Exposure to high levels of carbon monoxide has been linked to impaired vision, decreased work capacity, decreased learning ability and decreased performance of difficult tasks. Carbon monoxide can also contribute to the formation of smog.

The majority of carbon monoxide is emitted from vehicles (including cars, trucks and construction equipment), with smaller amounts from fuel combustion, wood burning stoves and industrial processes such as metal and chemical manufacturing.

A total of 673 facilities in Canada and the United States reported releases of carbon monoxide above the higher US NEI threshold. The 143 matched Canadian NPRI facilities reported almost 836,200 tonnes, and the 530 matched US NEI facilities 2.5 million tonnes.

- In NPRI, primary metals facilities, mainly aluminum smelters, reported 51 percent of the total, the lumber and wood products sector reported 14 percent and the paper products sector reported 12 percent.
- In the US NEI, primary metals facilities also represented the largest air releases of carbon monoxide, with 38 percent, followed by electric utilities, with 16 percent, and chemical manufacturers, with 14 percent.

Particulates

Particulate matter is all airborne solid and liquid particles, except pure water, that are microscopic in size. Particulates can contain many different types of chemicals such as sulfates, nitrates, ammonia, trace metals and carbon compounds.

Particulates vary in size. In general, the size of particulate matter is inversely proportional to its effect on human health because the smaller the particulate, the more likely it is to be carried deep into the lungs. Numerous studies have linked particulate matter to cardiac and respiratory problems such as asthma, bronchitis and emphysema.

Particulates can also reduce visibility by scattering and absorbing light. This reduced visibility or regional haze is becoming a significant problem in many areas in North America. Much of the haze is due to secondary particulate matter, which is formed when gases, especially sulfur oxides, convert into particulate matter in the atmosphere.

Particulates emitted directly into the air can come from such sources as cars, trucks and buses, industrial facilities, construction sites, unpaved roads, stone crushing and wood burning. Particles formed in the air from the chemical change of gases can result from fuel combustion in motor vehicles, at power plants, and in other industrial processes.

A total of 629 facilities in Canada and the United States reported on particulates less than 10 microns above the US NEI threshold. These facilities reported almost 268,100 tonnes of air releases of particulates less than 10 microns for 2002. However, these sources are dwarfed by other sources such as unpaved roads, agricultural areas and open burning, which accounted for 17.4 million tonnes in the United States in 2002 and 4.6 million tonnes in Canada in 2000.

A total of 384 facilities reported on particulates less than 2.5 microns above the US NEI threshold to NPRI and the US NEI. These facilities reported over 128,900 tonnes of air releases of particulates less than 2.5 microns for 2002.

1

PRTRs in North America

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Introduction to *Taking Stock 2002*

- **Chapter 1** provides an **introduction** to PRTRs, the CEC and the *Taking Stock* web site. It describes the similarities and differences in PRTR programs in the United States, Canada and Mexico, and information to assist users in understanding the data.
- **Chapter 2** describes the **methodology** for matching the common chemicals and industries from the PRTRs in Canada and the United States for this report (comparable data for Mexican facilities for 2002 are not available).
- **Chapter 3** describes the new NPRI data available for **criteria air contaminants** for 2002 and criteria air contaminant data from the US National Emissions Inventory and from the Mexican COA.
- **Chapter 4** presents data on **total releases and transfers in 2002**, based on the matched North American data set.
- **Chapter 5** presents data for **on-site and off-site releases in 2002**. These data cover releases on-site to the air, surface waters, underground injection and land. The analyses also cover off-site releases, i.e., the amounts that facilities transfer to other locations for disposal.
- **Chapter 6** presents **changes in releases and transfers for 1998–2002**. The data include chemicals commonly reported over this time period and all industry sectors and transfer categories in the matched data set.
- **Chapter 7** presents **trends in releases and transfers for 1995–2002**. The data include all chemicals commonly reported over this time period, but do not include transfers to recycling or data from the recently added industrial sectors.
- **Chapter 8** presents data on **transfers**, including cross border transfers.
- **Chapter 9** presents analyses for **special groups of chemicals** in the matched data set, including carcinogens and California Proposition 65 chemicals.
- **Chapter 10** presents analyses of **persistent, bioaccumulative toxic (PBT) chemicals**, including lead, mercury, dioxins/furans, hexachlorobenzene and polycyclic aromatic compounds.
- **Appendix A** lists the chemicals reported under the three national PRTRs. **Appendix B** is the list of chemicals in the matched data set. **Appendix C** identifies facilities that appear in tables in this report. **Appendix D** indicates potential health effects of chemicals with large totals for releases, transfers, or both. **Appendix E** indicates uses of chemicals with large totals for releases, transfers, or both. **Appendices F** through **H** show the reporting forms for 2002 for the US TRI, the Canadian NPRI, and the Mexican RETC.

1.1 Introduction

North Americans are concerned about the effects of chemicals on their health and the environment. Central registries of the releases and movement of toxic substances can help provide information to the public on the sources and handling of these chemicals. Known as pollutant release and transfer registers (PRTRs), these national registries are designed to track the quantities of chemicals that industrial facilities have released into the air, water or land or transferred off-site to other locations for further management or disposal. Data on releases and transfers of chemicals are submitted by individual facilities. These data are then fed into a national, publicly available database. PRTRs are a cornerstone in the effort to provide all members of society—citizens, corporate leaders, environmental advocates, researchers, government officials—with a valuable tool for setting priorities, promoting environmental improvement and tracking progress.

This report is the ninth in the annual *Taking Stock* series prepared by the Commission for Environmental Cooperation of North America (CEC). It analyzes the amounts of chemicals released and transferred by facilities. It draws from existing publicly available data from the US Toxics Release Inventory (TRI), the Canadian National Pollutant Release Inventory (NPRI) and, to a limited extent, from the Mexican *Registro de Emisiones y Transferencia de Contaminantes* (RETC).

Taking Stock 2002 is available from the CEC in hard copy or on the CEC web site at <http://www.cec.org>. Also, searches of the database to answer customized questions about chemicals, industry sectors, facilities and time trends are available at *Taking Stock Online* <http://www.cec.org/takingstock/>.

Through its annual *Taking Stock* report and web site, the CEC aims to:

- provide an overview of North American pollutant releases and transfers, thereby enabling citizens to better understand the sources and handling of industrial pollution;
- provide information to help national, state and provincial governments as well as industry and communities identify priorities for pollution reduction;
- invite reductions in North American pollutant releases and transfers through information comparison;
- enable a more informed dialogue among citizens, industry and government and foster collaborative actions towards a more healthy environment;
- provide analyses and contextual information to assist citizens in understanding North American PRTR data; and
- encourage enhanced comparability of North American PRTR systems.

The preparation of this *Taking Stock* report, as in previous years, has benefited from the valuable input and suggestions provided by a broad range of stakeholders through the annual consultative process. The CEC would like to thank those groups and individuals who have contributed their ideas, time and enthusiasm to the continued development of the *Taking Stock* series.

1.1.1 What is a Pollutant Release and Transfer Registers?

Pollutant release and transfer registers (PRTRs) provide annual data on the amounts of chemicals released from a facility to the air, water, land and injected underground and transferred off-site for recycling, treatment or disposal.

PRTRs are an innovative tool that can be used for a variety of purposes. PRTRs track certain chemicals and, thereby, help industry, government and citizens identify ways to decrease releases and transfers of these substances, increase responsibility for chemical use, prevent pollution and reduce waste generation. For example, many corporations use the data to report on their environmental performance and to identify opportunities for reducing/preventing pollution. Governments can use PRTR data to guide program priorities and evaluate results. Communities and citizens use PRTR data to gain an understanding of the sources and management of pollutants and as a basis for dialogue with facilities and governments.

While there are many different environmental reporting databases, the CEC Council Resolution 00-07 identified a set of basic elements that are central to the effectiveness of PRTR systems:

- reporting on individual substances;
- reporting by individual facilities;
- covering all environmental media (i.e., releases to air, water, land and underground injections, and transfers off-site for further management);
- mandatory, periodic reporting (i.e., annually);
- public disclosure of reported data on a facility- and chemical-specific basis;
- standardized reporting using computerized data management;
- limited data confidentiality and indicating what is being held confidential;
- comprehensive scope; and
- mechanism for public feedback for improvement of the system.

PRTRs collect data on **individual chemicals**, rather than on the volume of wastestreams containing mixtures of substances, because this allows the compilation and tracking of data on releases and transfers of individual chemicals. **Reporting by facility** is key to locating where releases occur and who or what generated them. Much of the power of a PRTR comes from

PRTRs: A Priority Focus for CEC

The North American Commission for Environmental Cooperation (CEC), mandated under the terms of the North American Agreement on Environmental Cooperation, facilitates cooperation and public participation in fostering the conservation, protection and enhancement of the North American environment for the benefit of present and future generations, in the context of increasing economic, trade and social links between Canada, the United States and Mexico. The CEC recognizes the importance of pollutant release and transfer registers—such as the Toxics Release Inventory (TRI) in the United States, the National Pollutant Release Inventory (NPRI) in Canada and the *Registro de Emisiones y Transferencia de Contaminantes* (RETC) in Mexico—for their potential to enhance the quality of the North American environment.

At the Second and Third Annual Regular Sessions of the CEC in 1995 and 1996, the top-ranking environmental officials of the three North American countries (the Council) committed to the creation of a North American Pollutant Release Inventory which will bring together, for the first time, existing national public information from the three countries, help improve the quality of the environment by providing the public with information to assess North American pollutant sources and risks, and serve as a model for similar efforts in other parts of the world.

At the Fourth Annual Regular Session of the CEC in June 1997 the Council passed Council Resolution 97-04 "Promoting Comparability of Pollutant Release and Transfer Registers (PRTRs)," which commits the three governments to work toward adopting more comparable PRTRs.

At the Seventh Annual Regular Session of the CEC in June 2000, the Council passed Resolution 00-07 on "Pollutant Release and Transfer Registers," through which it emphasized the value of PRTRs as tools for sound management of chemicals, for encouraging improvements in environmental performance, and for providing the public with access to information on pollutants in their communities.

The Ninth Annual Regular Session of the CEC in June 2002 adopted Council Resolution 02-05, an "Action Plan to Enhance Comparability Among Pollutant Release and Transfer Registers (PRTRs) in North America" to focus, as a matter of priority, on:

> adopting the use of the North American Industrial Classification System codes…; pursuing comparability in the manner in which PRTR data on persistent bioaccumulative toxic substances are reported; exploring the adoption, where appropriate and in light of national priority substances, of activity-based reporting thresholds under the Mexican RETC…; and supporting Mexico in it efforts to achieve a mandatory PRTR reporting system.

At the 2004 Council session in Puebla, Mexico, the Council issued a declaration that charts a new path forward, based on the comprehensive review of the first ten years of CEC operations. The Puebla Declaration laid out three broad priorities for the years ahead, including information for decision-making, capacity building, and trade and the environment. The PRTR program acts in concert with these priorities—in particular, as the *Taking Stock* reports and web site database supply information for decision-making and the work on harmonization support capacity building in Mexico.

public disclosure of its contents. Active dissemination to a wide range of users in both raw and summarized form is important. Publicly available, chemical- and facility-specific data allow interested persons and groups to identify local industrial sources of releases and support regional and other geographically based analyses.

1.2 Overview of National PRTR Programs in North America

Each of the three North American countries has a PRTR program. They are:

- the Toxics Release Inventory (TRI) in the United States;
- the National Pollutant Release Inventory (NPRI) in Canada; and
- the *Registro de Emisiones y Transferencia de Contaminantes* (RETC) in Mexico.

1.2.1 The US TRI

The 2002 reporting year is the sixteenth year of the US TRI. TRI was created under the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986. The original TRI list contained over 300 chemicals, covered the manufacturing sectors, and required information on on-site releases, transfers off-site for disposal and transfers off-site for treatment. Passage of the Pollution Prevention Act of 1990 broadened the information TRI collects to include off-site transfers to recycling and energy recovery as well as facilities' management of toxic chemicals in waste on-site, such as on-site treatment, recycling and energy recovery, as well as qualitative information on pollution prevention activities (e.g., source reduction) at the facility. The first year for the expanded information reporting was 1991.

Scope of Current Program

There have also been changes to the TRI chemical list as the public and industry petitioned EPA to add or remove chemicals. One of the most significant expansions to the TRI list of chemicals was the addition of nearly 300 chemicals starting with the 1995 reporting year. There are now more than 600 chemicals and 30 chemical categories on the TRI list.

Section 313 of EPCRA, the law that created TRI, identified the manufacturing sectors as the original set of industries required to submit TRI reports. Beginning with the 1998 reporting year, several other industries were added to capture information from industries closely related to the manufacturing sector, providing energy or services or further managing products or waste from the manufacturing sector. The seven sectors added to TRI were metal mines, coal mines, electricity generating facilities, petroleum bulk storage terminals, chemical wholesale distributors, hazardous waste management facilities and solvent recovery facilities.

For the 2000 reporting year, TRI lowered the reporting thresholds for chemicals that are persistent, bioaccumulative and toxic (PBT), such as mercury and its compounds. TRI also added other PBTs, such as dioxins and furans. Reporting for another PBT, lead and lead compounds, at a lowered threshold started with the 2001 reporting year.

Ongoing and Future Changes

EPA is working on implementing the North American Industrial Classification System (NAICS) codes in TRI and aims to have a rule ready for the reporting year 2006. In addition, the TRI program has proposed to collect information for dioxins and dioxin-like compounds in toxic equivalents (TEQs), in addition to mass quantities. Adding the reporting of TEQ values for dioxins/furans is under discussion for TRI for the 2006 or 2007 reporting year. Such reporting would be in addition to the currently reported grams.

TRI is also working on a rulemaking with regard to mining in light of the courts' responses to several lawsuits and, in particular, how reporting requirements may apply to extraction and beneficiation. Under TRI the contents of overburden and waste rock are not considered for the purposes of reporting threshold calculations. However, if the threshold is otherwise exceeded by the facility, then releases or transfers of TRI substances in waste rock must be reported unless an exemption applies. Releases and transfers of chemicals found in the unconsolidated material in overburden are not required to be reported. In April 2003, the US District Court for the District of Columbia upheld EPA's interpretation that mine tailings are not eligible for the *de minimis* exemption to TRI reporting. However, the Court set aside EPA's interpretation of the exemption as it applied to waste rock. As a result EPA has stated that listed chemicals in *de minimis* concentrations in a mine's waste rock may now be eligible for exemption from TRI reporting requirements.

US EPA has initiated the development of a framework for assessing the hazards and risks of metals. In December of 2004 EPA released a draft version of the Metals Framework document for public comment and peer review from EPA's Science Advisory Board (SAB). The SAB then discussed their review of the draft Metals Framework document with EPA at a meeting in February 2005. Once the Metals Framework document has been finalized, it is the intent of the TRI program to take the final document and apply it, as appropriate.

EPA has developed interactive, user-friendly software, TRI – *Made Easy*, or *TRI-ME*, that guides reporters through the TRI reporting process with a series of questions that help determine if a facility needs to comply with the TRI reporting requirements. For facilities that determine they are required to report, the software provides guidance for each data element on the reporting forms. For reporting year 2003, 92 percent of the facilities that reported used *TRI-ME*. Facilities also took advantage of the electronic signature feature in TRI-ME that allows them to submit forms and certification statements via the Internet using EPA's Central Data Exchange (CDX). During reporting year 2003, 36 percent of all TRI reports were filed via the Internet using CDX.

EPA's TRI program is making efforts to reduce reporting burdens on the regulated communities. A key issue is how to reduce the burden without sacrificing the utility of the data. It should be noted that that stakeholders have widely differing views on how to accomplish this. The TRI program is undertaking good faith reform efforts to address burden reduction that consider these divergent viewpoints. In 2003, EPA initiated an online stakeholder dialogue requesting comment on a number of options for reducing the burden associated with TRI reporting. Following review of the over 700 comments received, EPA began development of two rules that it plans to propose over the next year to reduce the time and resources needed to submit annual data reports to EPA. EPA proposed the first of the two rules, the Toxics Release Inventory Forms Modification Rule, on 10 January 2005 (70 FR 1674-1686). If adopted, the proposal would eliminate some redundant or seldom-used data elements and modify other reporting requirements on the TRI reporting forms. Specifically, EPA is proposing to no longer require TRI facilities to report locational information (latitude and longitude data) and several facility identifiers (regulatory assigned identification codes for each facility). Instead, the data would be obtained from existing EPA databases and made available to TRI data users. The second rulemaking, to be proposed later in 2005, will examine the potential for more significant reporting modifications with greater potential impact on reducing reporting burden. The options which may be considered in that rulemaking include increasing reporting thresholds for small businesses, or for classes of chemicals or facilities, expanding eligibility for Form A, introducing a "no significant change" option for chemical reports that have not changed significantly relative to a baseline reporting year, and expanding the use of range codes. Because of the greater complexity and larger impacts potentially associated with this latter group of changes, additional analysis is needed to more thoroughly characterize its impact on TRI reporters and data users.

1.2.2 Canada's NPRI

The 2002 data are the tenth set reported to NPRI. The NPRI was established with the help of a multi-stakeholder advisory committee, which included representatives from industry, environmental and labor organizations, and provincial ministries as well as federal departments. In the 1999 renewal of the Canadian Environmental Protection Act (CEPA) were provisions that enshrine mandatory NPRI reporting and the annual publication of a summary report.

Ongoing stakeholder consultations have modified reporting requirements since the first reporting year 1993 including: mandatory reporting on pollution prevention activities (1997) and increased detail on types of activities (2001), mandatory reporting of off-site transfers to recycling and energy recovery (1998), addition of 73 new chemicals (1999), addition of persistent bioaccumulative toxic chemicals such as dioxins and furans, lowering of thresholds of mercury and polycyclic aromatic hydrocarbons (2000).

Major Changes to NPRI for 2002

Several important changes were made to NPRI for the 2002 reporting year. For the first time, reporting on criteria air contaminants was required. Reporting on air emissions of carbon monoxide, nitrogen oxides, particulate matter (including total particulate matter, particulate matter less than 10 microns and particulate matter less than 2.5 microns), sulfur dioxide, and volatile organic compounds was required. This major change more than doubled the number of facilities reporting. Also for 2002, the reporting thresholds were lowered for arsenic and lead and their compounds (from 10 tonnes to 50 kilograms), tetraethyl lead (from 10 tonnes to 50 kg) and cadmium (from 10 tonnes to 5 kg). In addition, the most toxic form of chromium and its compounds, hexavalent chromium was listed separately at a 50 kg threshold. There were 274 chemicals on the NPRI list in 2002.

Several new types of facilities are required to report for the first time in 2002. These new types of facilities include: terminal operations (facilities involved in fuel distribution and storage), and facilities involved in painting and stripping of vehicles or their components (including the rebuilding and remanufacturing of vehicle components). In addition, municipal wastewater facilities will report to NPRI regardless of the number of employees and based on an effluent trigger of 10,000 cubic meters per day. Biomedical/ hospital and non-hazardous incinerators will also report at lower thresholds, from 100 tonnes to 26 tonnes per year.

NPRI also revised the methods of presenting NPRI information into:

- On-site releases: which includes releases to air, water and spills, leaks and other releases to land.
- Final disposal: which includes on-site disposal (landfill, land treatment and underground injection) and off-site disposal (landfill, land treatment, underground injection and storage).
- Off-site transfers to treatment prior to final disposal: which includes physical, chemical, biological, incineration or thermal treatment and treatment at a sewage treatment plant.
- Off-site transfers for recycling and energy recovery: which includes recycling and energy recovery.

This new method of grouping information was first used to present the 2001 data. On the NPRI web site these categories are compressed to releases, disposal (on- and off- site) and recycling.

Ongoing and Future Changes

Changes for the 2003 reporting year include the addition of the upstream oil and gas sector, changed reporting for nonylphenol and their ethoxylates, reporting of individual volatile organic compounds and addition of several new substances including carbonyl sulphide and phosphates. The greenhouse gas data originally proposed to be collected by NPRI, will be collected through Statistics Canada.

There are few changes for the 2004 reporting year. Proposed changes to add thallium, PCBs, NDMA, change the reporting of dioxins and furans to quantity based thresholds and removal the exemption for mining activities have not been implemented for the 2004 reporting year.

In 2002–2003, Environment Canada created working groups to develop proposals for future changes to NPRI. These three working groups—particulate matter speciation, mining exemption review, and harmonization (with Ontario's and others reporting systems) of emission monitoring regulations—have been developing options in 2004–2005 for changes to NPRI in 2005 and beyond.

1.2.3 The RETC in Mexico

Industrial facilities in Mexico under federal jurisdiction voluntarily report their annual releases and transfers of pollutants in Section 5 of the Annual Certificate of Operation (*Cédula de Operación Anual*—COA). Recent advances in the Mexican RETC include the establishment a legal framework for mandatory reporting and collaboration with state authorities. Mandatory reporting is expected to begin with the 2004 reporting year; a new reporting format was adopted in January 2005.

The Secretariat of Environment and Natural Resources (*Secretaría de Medio Ambiente y Recursos Naturales*—Semarnat) is the federal environmental authority in charge of the collection, management and analysis of COA data. The first reporting cycle covered the reporting year 1997. Section 5, "Pollutant Releases and Transfers," is the portion of the COA that contains information on releases to all media and transfers off-site and is most comparable to the PRTR data from Canada and the United States. Section 5 was optional for the 2002 reporting year.

Establishment of Legal Framework for the RETC

The first major step forward in the legal framework for RETC was the passage of enabling legislation by the Mexican Congress on 31 December 2001. Article 109 of the federal environmental law, the *Ley General del Equilibrio Ecológico y la Protección Ambiental* (LGEEPA), was modified. Semarnat, the states, the Federal District and municipalities are now required to provide data and documents contained in the environmental authorizations, licenses, reports, permits and concessions received by the different authorities to an RETC. The institutions and persons responsible for the contaminant sources are obliged to submit to the authorities all information, data, and documents necessary to integrate the RETC. The reported information will be public and will function as a declaration. Access to this information is given by the Ministry and will be actively disseminated. Semarnat is currently in the process of developing the regulations for the required reporting. On 28 January 2005, the agreement on the new COA format and guidelines for completing it were published in the *Diario Oficial*. It is expected that an agreement on the list of substances and their reporting thresholds will follow soon.

PRTRs at the State and Municipal Levels

Mexico has established a program, the Program of Institutional Environmental Development (*Programa de Desarrollo Institucional Ambiental*—PDIA), to decentralize environmental responsibilities. As a consequence to this program, the RETC is also partially decentralized with the states having a role in collecting data from certain industry sectors and local municipalities collecting data from those under its jurisdiction. By 2004, nearly all of the states (with the exception of Chihuahua) completed their legal framework to allow enforcement of the RETC. Currently, the states of Aguascalientes and Tamaulipas are the most advanced and were able to publish their state RETC. Twenty-two states are willing to adopt the format used by the federal government. The communication with the most important municipalities has been established to support the development and implementation of the RETC at the municipal level.

The state PRTRs cover more industry sectors than the federal one, including such sectors as vegetable and animal products, wood and its derivatives, food products, textiles and dress making, printing products, metal products, and graphic arts. Some service facilities are also required to report, including public bath installations, sports centers, hotels, laundry and dry cleaners, bakeries, hospitals and doctors offices, restaurants and tortillerias and flour mills.

Reporting for 2002

The voluntary reporting to the RETC is done through the Mexican norm (NMX-AA-118-SCFI-2001), which came into effect in June 2001. This norm establishes the list of substances and thresholds for the voluntary RETC, the procedures to modify the substance lists, the reporting format and reporting procedures.

For the 2002 reporting year, 2,038 COA forms were received, of which 216 facilities filled in amounts of air, land, water releases and transfers to sewage in Section 5 (the RETC), which is the voluntary reporting of releases and transfers. Facilities covered by the COA are those under federal jurisdiction and include facilities in 11 industrial sectors: petroleum (includes oil and gas extraction and petroleum refining), chemical and petrochemical, paints and dyes, metallurgy (includes the iron and steel industry), automobile manufacture, cellulose and paper, cement and limestone, asbestos, glass, electric power generation, and hazardous waste management. These industry sectors were chosen based on their use of processes that may emit to the atmosphere gases or solid or liquid particles and that involve chemical reactions, thermal operations, foundry or metal tempering.

Reporting on criteria air contaminants is done in Section 2 of the COA. Required reporting covers air emissions of sulfur dioxide, nitrogen oxide, particulates and VOCs. Other criteria air contaminants covered by the COA (but whose reporting is voluntary) include unburned hydrocarbons, carbon monoxide, and carbon dioxide.

General information on the RETC and the legal requirements of reporting the COA are presented in the following web pages: <http://www.semarnat.gob.mx/dgca/retc/general/gral.shtml> and <http://www.semarnat.gob.mx/dgca/tramites/requisitos/coa/coa.shtml>.

1.3 Overview of PRTR Reporting in North America

The PRTRs have many basic similarities since they stem from the same primary purpose—to provide publicly available information on a facility's releases and transfers to air, water and land. The Mexican RETC is part of an integrated reporting form called *Cédula de Operación Anual* (COA). Section 5 of the COA is the section providing data on pollutant releases and transfers and is the section most similar to NPRI and TRI. Reporting under Section 5 is currently voluntary and, thus, the data are not comparable to the mandatory data collected under TRI and NPRI. The Mexican data are also not made publicly available on a facility-specific basis. Thus, while there are similarities among the three North American PRTRs, each inventory also has its unique aspects, which result from its historical development and the special industrial characteristics of the country.

CEC Action Plan to Enhance the Comparability of PRTRs in North America

The three North American countries are committed to creating a more complete picture of industrial pollution in North America. The *Action Plan to Enhance the Comparability of PRTRs in North America* (available at <http://www.cec.org>) was adopted by the CEC Council in June 2002. It examines areas in which the three systems differ and sets forth actions to be pursued by the countries to reduce those disparities. Collaboration around the *Action Plan* enables the countries to share information on their unique approaches and to learn from each other.

Since the countries started working cooperatively, there have been some notable successes, including the mandatory reporting of off-site transfers in NPRI, the standardization of pollution prevention activity reporting in NPRI, the addition of PBT chemicals in NPRI and TRI and expansion of NPRI list of chemicals.

One of the most important achievements towards increased comparability of North American PRTRs has been the adoption of a mandatory requirement for RETC reporting and a provision requiring the RETC data to be made publicly accessible by chemical and facility. Although significant challenges remain due to the differing thresholds proposed by Mexico, the availability of mandatory data is a prerequisite for comparability and thus a key step forward.

All three countries have committed to looking to the other PRTRs to learn about reporting of chemicals that are not currently on their national lists. Only about 56 chemicals are common to all three PRTR lists. Some chemical such as hydrogen sulfide on NPRI list account for over two-thirds of releases and transfers. Other TRI chemicals, such as pesticides, are not on the NPRI list. Mexico's list does not contain many chemicals released and transferred in large quantities in TRI and NPRI, such as copper, zinc, hydrochloric acid, toluene and xylene. TRI and NPRI both reviewed the results of dioxins/furans reporting in each other's countries, identified gaps and have proposed changes that will increase comparability.

A similar situation exists for industries. Each PRTR requires reporting from a unique set of industries. NPRI reporting requirements include municipal incinerators and sewage treatment plants, two significant sources of pollutants that are not required to report to TRI or RETC. Mexico's PRTR will have counterparts at the state and municipal levels, providing for more extensive coverage of types of facilities.

1.3.1 Who reports to PRTRs in North America?

PRTRs require specific types of businesses to report. In general, manufacturing facilities are required to report. Canada's NPRI covers all business activities, with very few exceptions. Canada currently exempts those involved with the distribution, storage or retail sale of fuels; dentistry, agriculture, mining and oil and gas well drilling, if these facilities do not process or otherwise use the substances; research and training institutions; and vehicle repair facilities.

In the United States, manufacturers have been required to report to TRI since its inception, and federally owned facilities were added in 1994. Beginning with reporting for 1998, several additional industries associated with manufacturing, including metal mines, coal mines, electricity generating facilities, petroleum bulk storage terminals, chemical wholesale distributors, hazardous waste management facilities, and solvent recovery facilities, also have to report to TRI.

Mexico's reporting applies to any facility under federal jurisdiction. These include the following industrial sectors: petroleum, chemical and petrochemical, paints and inks, metallurgical, automotive, cellulose and paper, cement and limestone, asbestos, glass, electric power generation, and hazardous waste management. Other facilities are regulated by the states or municipalities, and some Mexican states have recently started to collect data from these industries.

Although some companies may centralize reporting procedures for all their facilities, individual submissions must be made for each facility. Both NPRI and TRI ask facilities to identify their parent companies.

1.3.2 Which Chemicals must be Reported?

Each PRTR system covers a specific list of chemicals. NPRI covers over 260 chemicals, TRI approximately 650 and RETC approximately 100. (Counts of the number of substances on a list vary, as some observers may count individual substances within a chemical category and others may not.) The Chemical Abstracts Service lists more than 19 million chemical substances and identifies more than 225,000 of them as regulated or covered by chemical inventories worldwide <http://www.cas.org/cgi-bin/regreport.pl>.

Seven air pollutants are listed in Section 2 of the Mexican COA, which facilities are required to fill out. These are sulfur oxides, nitrogen oxides, particulates, volatile organic compounds, unburned hydrocarbons, carbon monoxide, and carbon dioxide, although only reporting on the first four is mandatory. None of these are on the TRI lists, however NPRI added the criteria air contaminants sulfur oxides, nitrogen oxides, particulate matter, carbon monoxide, and volatile organic compounds for the 2002 reporting year. For a detailed comparison of the chemical lists in the three countries, see **Appendix A**.

In PRTRs, the amount of the chemical is reported and not the total volume of the mixture. This feature sets PRTRs apart from hazardous waste inventories or manifest systems, which generally report on the total volume of the mixture.

Chemicals often have more than one name (synonyms). Methyl bromide and bromomethane, for example, are names for the same substance. PRTRs rely on the identification systems of various authorities to specify the exact chemicals that are to be reported. NPRI and TRI use Chemical Abstracts Service (CAS) Registry Numbers. The CAS number of bromomethane, for example, is 74-83-9.

Facilities submit one form for each chemical. A facility reporting on 10 chemicals files 10 forms (electronically in Canada and electronically or on hard copy in the United States). Mexican facilities submit one form per facility listing all chemicals released or transferred. They can submit using hard copy or electronically.

1.3.3 When Is a Facility Required to Report?

Only facilities meeting specific reporting thresholds are required to report to PRTRs. Typically, the reporting threshold is based on the amount of chemical manufactured, used in a process (for example, as a reagent or catalyst), or otherwise used (for example, in cleaning industrial equipment). For NPRI, if 10 tonnes (22,050 pounds) or more of the substance is manufactured, processed or "otherwise used," then releases and transfers must be reported. For TRI, the thresholds are more than 25,000 pounds (11.34 tonnes) if a substance is manufactured or processed and 10,000 pounds (4.54 tonnes) if it is "otherwise used."

For the 1995 and subsequent reporting years, both Canada and the United States have required that the total weight of the byproduct, regardless of concentration, be included in the calculation of the reporting threshold.

Both NPRI and TRI also have an employee threshold. In general, only facilities where employees worked 20,000 hours or more (usually 10 or more full time employees) are required to report. Recently, NPRI has required that for some chemicals such as dioxins and furans, all facilities of certain types (such as incinerators) report regardless of employee size. RETC does not have an employee threshold.

Both TRI and NPRI require reporting if the amount of a substance in a mixture equals or exceeds one percent by weight. However, the United States has an additional lower threshold for carcinogenic chemicals: chemicals identified as carcinogens by the Occupational Safety and Health Administration standard must be reported at levels of 0.1 percent.

The net effect of these differences in reporting threshold is that, in general, US facilities will meet the threshold at slightly lower levels of chemical activity/use than Canadian ones.

While most of the chemicals on NPRI and TRI are subject to a "manufacture, process or otherwise use" threshold, all chemicals on the current Mexican RETC list are subject to an "on-site release" threshold. Also, the RETC reporting thresholds vary by type of substance. For example, the threshold for organohalogens, including ozone depleters, is 1,000 kg/year, whereas the threshold for metals, such as lead or mercury, is 1 kg/year. Unlike in NPRI and TRI, amounts transferred off-site are not included when calculating whether the reporting threshold has been met. The mandatory portion (Section 2) of the Mexican COA does not have reporting thresholds. However, only facilities under federal jurisdiction must report, and smaller facilities are not expected to fall under this classification. Reporting thresholds are under review as the Mexican RETC moves toward mandatory reporting. Semarnat plans to propose activity-based thresholds similar to those used under NPRI and TRI.

The United States also has a different reporting requirement for facilities with relatively small reportable amounts of a listed chemical. If a facility does not manufacture, process, or otherwise use more than 1 million pounds (454 tonnes) of the chemical, and if the facility's "total reportable amount"—all on- and off-site recycling, energy recovery, and treatment, plus production-related on-site releases and off-site transfers for disposal—is less than 500 pounds (227 kg), the facility may file a short certification statement that identifies the chemical but does not supply any quantitative information.

For releases of a substance that total less than one tonne, NPRI allows facilities to report just the total amount released and not the individual amounts released to air, water, land or underground injection. Therefore, in summary tables in this report, total releases will be more than the sum of the separate release categories. In contrast, the amounts of the individual releases for each medium are reported in TRI. Both NPRI and TRI require reporting of the amounts of individual types of transfers.

As our knowledge has increased of the potential for some chemicals, such as persistent bioaccumulative toxics (PBTs), to have health and/or environmental effects at very low concentrations, both NPRI and TRI have established new, lower reporting thresholds. For the reporting year 2000, lower thresholds were established for dioxins and furans, hexachlorobenzene (HCB), polycyclic aromatic compounds, and mercury and its compounds. The same has happened for lead in 2001 in TRI and 2002 in NPRI. However, dioxins and furans, HCB and polycyclic aromatic compounds are reported differently in TRI and NPRI and are difficult to compare. See **Chapter 10** for a discussion of the PBTs.

Reporting instructions give detailed information on the releases and transfers that facilities must report, and supply guidance to specific industries in published manuals and/or training sessions. Reporting instructions are available on the NPRI, TRI and RETC web sites, respectively, at <http://www.ec.gc.ca/pdb/npri/npri_gdocs_e.cfm> for NPRI guidance documents; at <http://www.epa.gov/triinter/report/index.htm> for TRI reporting materials and guidance, and at <http://www.semarnat.gob.mx/dgca/tramites/requisitos/coa/r_coa.shtml> for RETC reporting instructions.

1.3.4 How Does a Facility Estimate its Releases and Transfers?

Facilities can use a variety of methods to report releases and transfers. Amounts reported to NPRI and TRI can be estimates. These estimates may reflect monitoring, engineering calculations, emission factors (which identify the amounts of a chemical that can be expected to result from particular industrial processes or from use of specific equipment), or other estimation techniques. An advantage of this approach is that most facilities have information on hand about inputs, and the emission factors used include those from governmental sources or industry associations that provide a consistent methodology for similar facilities.

Facilities that report to PRTRs are free to revise their previous years' submissions at any time. They may correct previous errors, or they may re-calculate earlier years' data using a different estimation method. Some facilities that adopt new methods of estimating reportable amounts find that their results for the current year give a very different picture of releases and transfers from previous years. They may appear to have made large increases or decreases in reportable amounts, when in fact only the estimation methods have changed. These facilities may choose to revise earlier submissions so that their totals over time reflect consistent assumptions and approaches.

1.3.5 How Are Sectors Identified in PRTR Reporting?

Facilities are asked to report on the type of industrial operations they carry out. This allows facilities within the same sector to be grouped together. Canada has adopted the North American Industry Classification System (NAICS). Currently, the US TRI program uses its "Standard Industrial Classification" (SIC) system. These systems, however, are not the same. The Mexican COA uses the Mexican Activities and Products Classification (*Classification Mexicana de Actividades y Productos*—CMAP code), which is different yet again.

All three countries are moving towards the common North American Industry Classification System (NAICS). In reporting year 1998, NPRI facilities began reporting their NAICS code, along with the US SIC codes. The US TRI is expected to require NAICS codes for the 2006 reporting year, and the Mexican RETC is expected to implement the NAICS sometime in the future.

1.3.6 Are All of the Data Made Publicly Available?

A primary purpose of a PRTR is to provide the public with data about chemicals arising from industrial activities, so in general, both the NPRI and TRI programs limit the type of information that facilities can claim as secret and withhold from public disclosure. In the United States, the only claim of trade secrecy that can be made is for the identity of the chemical. All data on release and transfer amounts are part of the database. Claiming trade secrecy is not widespread: only 2 TRI forms out of 95,513 submitted for 2002 contained such claims. The trade secrecy claims were for substances for which there were zero releases and transfers. In Canada, all information in a report, including the identity of the facility, may be held confidential if it conforms to the criteria under the Federal Access to Information Act. According to the NPRI overview report, 10 facilities and 24 forms out of the national total of 14,932 forms (0.2 percent) were given confidential status for the 2002 NPRI reporting year. This represented 3,558 tonnes of releases and transfers.

1.4. Using and Understanding PRTR Data

1.4.1 Limitations of the PRTR Data

A principal factor in making good use of PRTR data is to know their limitations. PRTR data:

- do not encompass all potentially harmful chemicals (not all toxics or greenhouse gases);
- do not address all sources of chemicals such as mobile sources, (cars, trucks, offroad vehicles), agricultural activities or natural sources such as forest fires;
- do not include all facilities—only those that meet reporting requirements (generally 10 tonnes of chemical manufactured, processed or otherwise used);
- do not generally include facilities with less than 10 employees;
- do not describe daily or weekly releases or transfers, but provide annual summaries;
- do not identify all on-site releases and off-site transfers from a facility (only for listed chemicals for which reporting thresholds are met);
- do not always represent measurements of releases and transfers—they may be estimates derived using a variety of methods;
- do not describe the ultimate environmental fate of chemical substances;
- do not indicate risks from substances released or transferred by reporting facilities;
- do not identify exposures of human or wildlife populations to substances released or transferred by reporting facilities; and
- do not indicate the amount of chemicals allowed to be released under permits, licenses or agreements.

1.4.2 Toxicity and Human Health Effects

PRTR data supply information on amounts of substances released to the environment at specific locations. Identifying and assessing potential harm from particular releases of a chemical to the environment is a complex task, requiring information additional to that given in PRTRs, and the results are always tentative or, at best, relative.

A substance's potential to cause harm arises from both:

- its inherent toxicity—how harmful is it?—and
- exposure to it—how much and by what route?

What is known about the toxicity and ill effects of various chemicals results principally from studies of animals and human beings that have been exposed to them (ranging from laboratory tests to accidental exposures of human populations, such as workers). Various authoritative bodies have collected such data and, while PRTR data do not contain such information, the NPRI and TRI web sites link users to various sources of it.

The NPRI web site <http://www.ec.gc.ca/pdb/npri/npri_links_e.cfm#Sub> directs users to:

- the US Agency for Toxic Substances and Disease Registry for ToxFAQs summaries about hazardous substances <http://www.atsdr.cdc.gov/toxfaq.html>;
- the HazDat database, which includes information on the effects of hazardous substances on human health <http://www.atsdr.cdc.gov/hazdat.html>;
- the International Agency for Research on Cancer <http://www.iarc.fr/>; and
- Toxicology Excellence for Risk Assessment <http://www.tera.org/>, which compiles human health risk values from various international health organizations.

US EPA's TRI web site <http://www.epa.gov/tri> offers links to:

- summaries of effects, exposures, and environmental fate for some 40 selected TRI chemicals <http://www.epa.gov/chemfact/> and
- the ToxFAQs summaries mentioned above <http://www.atsdr.cdc.gov/toxfaq.html>.

Other sources of health and safety information about chemical substances include:

- Canadian Centre for Occupational Health and Safety—<http://www.ccohs.ca/oshanswers/>;
- State of New Jersey, Department of Health, Right-to-Know Hazardous Substances Fact Sheets—<http://www.state.nj.us/health/eoh/rtkweb/rtkhsfs.htm>; and
- National Safety Council, Crossroads on Chemical Databases and Material Safety Data Sheets (MSDSs)—<http://www.crossroads.nsc.org/msds.cfm> and Chemical Backgrounders <http://www.crossroads.nsc.org/chemicals.cfm>.

In its Scorecard <http://www.scorecard.org>, Environmental Defense has online information about potential ecological and human health effects for more than 6,500 chemicals. Scorecard reports on recognized and suspected health hazards associated with the chemical in several different categories, including cancer, cardiovascular or blood toxicity, developmental toxicity, endocrine toxicity, neurotoxicity, and reproductive toxicity, among others.

1.5 PRTRs Worldwide

PRTRs are gaining increasing interest and policy support worldwide. Following are some of the key developments at the international level:

- Chapter 19 of Agenda 21, adopted by some 150 heads of state and government during the 1992 United Nations Conference on Environment and Development (the "Earth Summit"), calls for the establishment of pollutant emission registers and promotes the principle of right-to-know.
- The OECD, through a 1996 Council Recommendation, has called on member countries to take steps to establish, implement and make publicly available a PRTR system. In 2003, OECD amended the Recommendation to add the core elements of a PRTR to provide additional county guidance. OECD has also published a Guidance Manual for Governments, guidance for reporting industries on techniques for estimating releases and transfers of pollutants and is finalizing reports on Uses of PRTRs and Quality Control and Assurance in PRTRs. See the OECD PRTR web site at <http://www.oecd.org/department/0,2688,en_2649_34411_1_1_1_1_1,00.html>.
- The Intergovernmental Forum on Chemical Safety (IFCS) discussed the need for a more strategic international approach for chemical management (SIACM) at Forum IV in Bangkok, 2003. PRTRs were recognized as a source of valuable environmental information for industry, governments and the public and as a mechanism to stimulate reductions in emissions. The previous Forum III meeting recommended that countries without a PRTR take steps to initiate a process to design national PRTRs that involve all affected and interested parties in the design, that take into account national circumstances and needs, and to link reporting requirements of international agreements to the national PRTRs. See <http://www.who.int/ifcs>.
- A Working Group on PRTRs was established under the United Nations Economic Commission for Europe (UN/ECE) Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, known as the Aarhus Convention. The Convention came into force in October 2001. In 2003, a Protocol on PRTRs developed under the Convention was signed by 36 countries and the European Community. This protocol is the first legally binding international agreement on PRTRs. Canada, US and Mexico have not signed the Protocol. See <http://www.unece.org/env/pp/>.
- Another international mechanism, the Inter-Organization Programme for the Sound Management of Chemicals (IOMC), has a PRTR Coordinating Group that seeks to improve coordination between international organizational, governments and other interested parties on PRTRs. The group includes UNITAR, UNEP and other organizations that have been actively supporting efforts in developing countries and countries with economies in transition to establish PRTRs. For more information, see <http://www.who.int/iomc/>.
- The Health and Environmental Ministers of the Americas held a follow-up to the April 2001 Summit of the Americas in which they agreed to consider working towards developing PRTRs as a tool to manage exposure to chemical releases (see <http://www.ec.gc.ca/international/regorgs/hema_e.htm>).
- The 2002 World Summit on Sustainable Development meeting in Johannesburg, South Africa included support for the development of PRTRs as part of promoting the development of coherent and integrated information on chemicals.
- Mexico hosted a PRTR Meeting of the Americas in April 2004, organized by UNEP and UNITAR with support from the Government of Canada. A number of Latin American countries are considering or have initiated PRTR development.

1.6 North American PRTR Contacts

Public Access to Canadian NPRI Data and Information

Information on NPRI, the annual report, and the databases can be obtained from Environment Canada's national office:
Headquarters:
Tel: (819) 953-1656
Fax: (819) 994-3266

Environment Canada on the Internet: <http://www.ec.gc.ca>
NPRI data on the Internet, in English and French: <http://www.ec.gc.ca/pdb/npri>
e-mail: npri@ec.gc.ca

Pollutionwatch at <http://www.pollutionwatch.org>

Additional Information on the Mexican RETC
Semarnat
Dirección de Gestión Ambiental
Av. Revolución 1425 – 9
Col. Tlacopac, San Angel
01040 Mexico, D.F.
Tel: (525) 624–3470
Fax: (525) 624–3584
e-mail: dgca@semarnat.gob.mx

Semarnat on the Internet: <http://www.semarnat.gob.mx/wps/portal>
Web site for the RETC on the Internet, in Spanish: <http://www.semarnat.gob.mx/dgca/retc/general/gral.shtml>
General information on Semarnat on the Internet, in English: <http://www.semarnat.gob.mx/dgeia/web_ingles/>
Information on RETC in English is not currently available.

Public Access to US TRI Data and Information
The EPA's TRI User Support [TRI-US, (800) 424-9346 within the United States or (202) 260-1531] provides TRI technical support in the form of general information, reporting assistance, and data requests.
EPA on the Internet: <http://www.epa.gov>
TRI information and selected data on the Internet: <http://www.epa.gov/tri>

Online Data Access
TRI Explorer: <http://www.epa.gov/triexplorer>
EPA's Envirofacts: <http://www.epa.gov/enviro/html/toxic_releases.html>
RTK-NET: <http://www.rtk.org>
National Library of Medicine's Toxnet (Toxicology Data Network) computer system: <http://toxnet.nlm.nih.gov/>
Environmental Defense Scorecard home page: <http://www.scorecard.org/>

Public Access to North American Matched Data
Though the CEC's *Taking Stock Online* database: <http://www.cec.org/takingstock/>

2

Methods Used in *Taking Stock*

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Key Findings

- *Taking Stock* compiles comparable data from the US and Canadian PRTR systems to give a North American perspective of the amounts of chemicals released to the air, water, and land, and transferred off-site for recycling or other management. A "matched" data set is prepared that includes only those chemicals and industrial sectors for which comparable data are available from both systems. Data from Mexico's RETC are not available for the 1995–2002 reporting years.
- Over half of the chemical reports (not including reports for the criteria air contaminants) under NPRI and over 80 percent under TRI are included in the *Taking Stock* matched data set for 2002. These comparable reports represent approximately 21 percent of NPRI total reported amounts and 77 percent of TRI amounts. One chemical, hydrogen sulfide, is not on the current TRI list but is on the NPRI list and represents 60 percent of the amounts reported to NPRI for 2002. Excluding hydrogen sulfide reported by the oil and gas extraction industry, the matched data set represents 57 percent of the total reported amounts in NPRI.
- NPRI lowered reporting thresholds from 10 tonnes to 50 kg for arsenic and its compounds and for cadmium and its compounds starting with the 2002 reporting year. TRI has not changed reporting thresholds for these chemicals so these chemicals are no longer in the matched data sets.
- Data for previous years (1995 to 2001) are also included in this *Taking Stock* report. There are three different matched data sets: (1) the 2002 matched set of chemicals and industries, (2) the 1998–2002 matched data set, which is used to look at changes from 1998 to 2002, and (3) the 1995–2002 matched data set, which is used for analyses of eight-year trends from 1995 to 2002. The 1998–2002 matched data set contains 153 chemicals reported by the manufacturing sector plus coal mining, electric utilities, hazardous waste treatment and solvent recovery facilities and chemical wholesalers. This data set excludes chemicals added to NPRI and chemicals and industry sectors whose reporting definition has changed, such as mercury and lead and their compounds and petroleum bulk terminals. The 1995–2002 matched data set includes the same 153 chemicals and only the manufacturing sector. This data set excludes industry sectors added to TRI for 1998 and to NPRI for 2002, chemicals added to NPRI, chemicals whose reporting definition has changed, such as mercury and lead and their compounds, and transfers to recycling and energy recovery. These exclusions make it possible to compare across years during which reporting requirements have changed. However, because each data set is based on different elements, each data set may yield different results. Readers are urged to take note of the data set in interpreting results.
- The petroleum bulk terminals industry sector was added to the NPRI reporting requirements starting with the 2002 reporting year. This industry sector was added to TRI starting with the 1998 reporting year. With its addition to NPRI, this sector is included only in the 2002 matched data set.

2.1 Introduction

This chapter explains how the North American data set is created from Canadian National Pollutant Release Inventory (NPRI) and the US Toxics Release Inventory (TRI). Comparable data are not yet available under the Mexican PRTR program, the *Registro de Emisiones y Transferencia de Contaminantes* (RETC). Reporting under Section V of the Mexican reporting form was voluntary for 2002 and, thus, the data are not comparable to the mandatory data collected under TRI and NPRI. As Mexican data become available, they will be incorporated into this report.

Taking Stock 2002 summarizes the comparable data from these databases that industrial facilities filed for the 2002 reporting year, the most recent public data available at the time this report was written. This chapter explains the specific steps needed to create the comparable, "matched" data set.

2.2 Creating the *Taking Stock 2002* Matched Data Set

Each country's PRTR has evolved with its own list of chemicals and industries. In order to obtain a North American picture of releases and transfers of chemicals, not all data submitted to the individual countries' PRTR systems can be used; only those data common to both systems. This matching process eliminates chemicals reported under one system but not the other. It also eliminates data from industry sectors covered by one PRTR but not the other. Thus, the North American database used in this report consists of a matched data set of industries and chemicals common to NPRI and TRI.

These PRTR reports were submitted by facilities during the summer of 2003. The US EPA released the TRI data to the public in June 2004. The NPRI data used in this report were obtained from the Environment Canada web site in July 2004. At the same time updated versions of previous years data for TRI and NPRI were also made available by the governments. These updated data have been used in this report.

Descriptions of Releases and Transfers Used in this Report

Releases On- and Off-site

A release is the entry of a chemical substance into the environment. Facilities report amounts of the listed chemicals they have released to the environment at their own location ("on-site"). Amounts are reported separately for each environmental medium:

- **Air emissions**—Releases to air that occur through identified outlets such as stacks ("smokestacks") or vents are labeled "stack" or "point" emissions. Air releases that occur because of leaks or valves are labeled "fugitive" or "non-point" emissions.
- **Surface water discharges**—Releases to surface water bodies such as rivers and lakes generally occur through discharge pipes. Wastewater is usually treated first, to remove or minimize its pollutant content. Rainwater may also wash pollutants from on-site waste storage areas into surface waters. These releases from run-off are also reportable.
- **Underground injection**—Facilities may inject listed chemicals in waste into deep underground wells, a practice more common in certain parts of the United States than in Canada. Underground injection is regulated, and deep wells that receive toxic waste are intended to isolate the pollutants from groundwater sources. Underground injection is not practiced in Mexico.
- **On-site land releases**—Releases to land at the facility include burying chemical waste in landfills, incorporating it into soil ("land treatment"), holding it in surface impoundments, accumulating it in waste piles, or disposing of it by other methods.

Facilities also report transfers off-site that represent releases to the environment at the off-site location. These include:

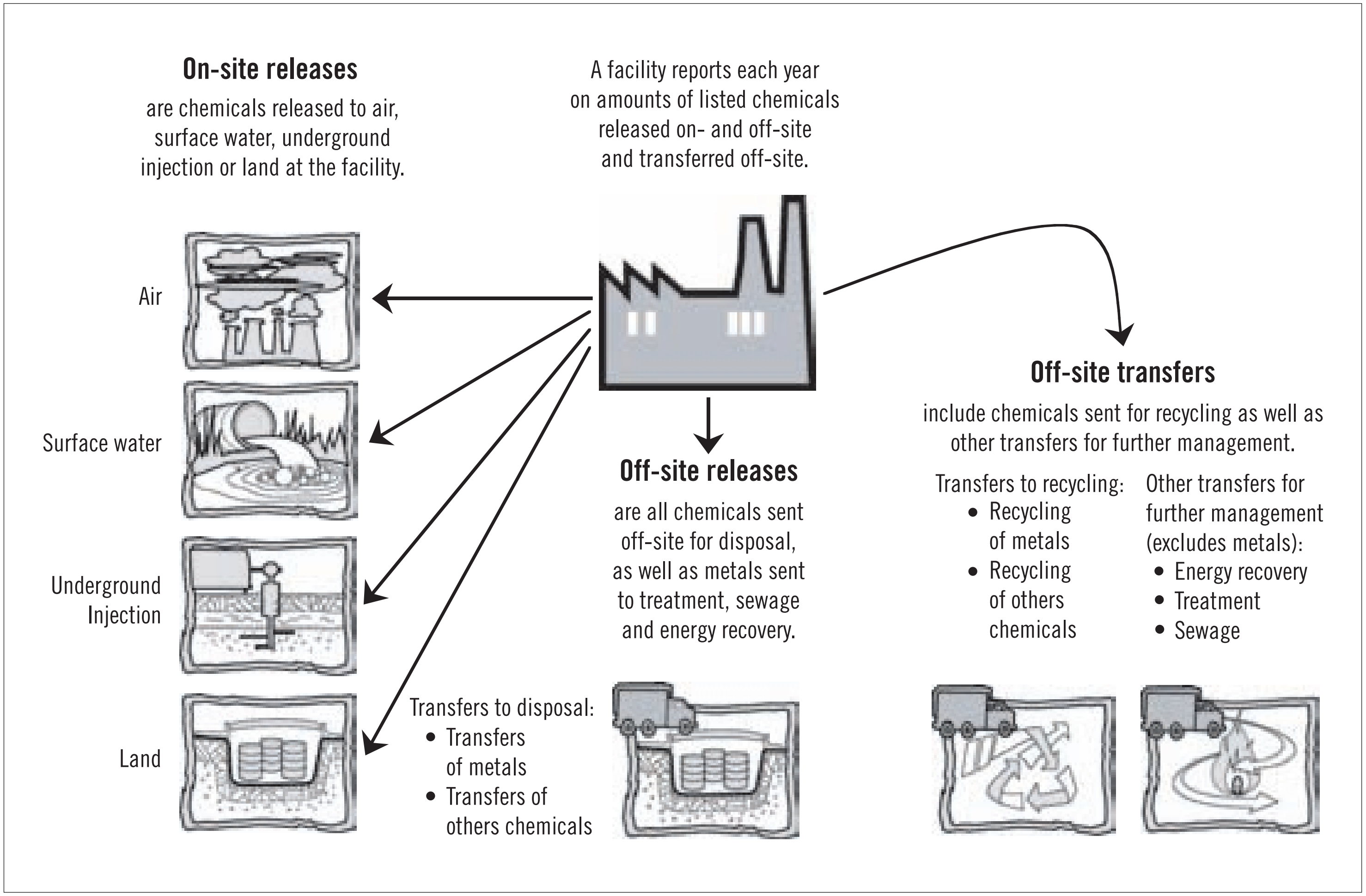
- **Disposal**—Waste sent off-site to another facility for disposal may be disposed of on land or by underground injection. These methods are the same as on-site land releases and underground injection, although they occur at locations away from the originating facility.
- **Transfers of Metals**—In the *Taking Stock* analyses, transfers of metals to disposal, sewage, treatment, and energy recovery are included in the off-site releases category to make the TRI and NPRI data comparable. TRI classifies all transfers of metals as transfers to disposal because metals sent to energy recovery, treatment, or sewage treatment may be captured and removed from waste and disposed of in landfills or by other disposal methods, but are not destroyed by treatment processes or burned in energy recovery units.

Transfers for Further Management

- **Recycling**—Chemicals in the materials sent off-site for recycling are generally recovered by a variety of recycling methods, including solvent recovery and metals recovery. They can be sent off-site for processing, cleaning, or reclamation and returned to the originating facility or made available for use by other facilities.
- **Energy Recovery**—Chemicals in materials sent off-site for energy recovery are combusted in industrial furnaces (including kilns) or boilers that generate heat or energy for use at the off-site location. Energy recovery is applicable only when the material has a significant heating value and when it is used as an alternate for fossil fuel or other forms of energy.
- **Treatment**—Chemicals can be sent for physical, chemical, or biological treatment. Neutralization is an example of chemical treatment and incineration is an example of physical treatment. Treatment is intended to alter or destroy the chemical. Treatment processes must be appropriate for the particular substance—a chemical that will not burn, for example, cannot be successfully incinerated.
- **Sewage Treatment**—Facilities may send their chemical waste to sewage treatment facilities—municipal sewage treatment plants (MSTPs) in Canada or publicly owned treatment works (POTWs) in the United States. The effectiveness of sewage treatment depends on both the substance and the sewage plant's processes. Volatile chemicals are likely to evaporate (releases to air). Typically, secondary treatment processes apply microorganisms (with aeration or oxygenation) to biodegrade organic compounds.

Please note that this terminology is specific to the *Taking Stock* report and may differ from terminology used by the individual PRTR programs.

Figure 2–1. PRTR Releases and Transfers in North America



2.2.1 Matching for Industry Sectors

Only sectors that are common to both TRI and NPRI are part of the matched data set.

There are three different data sets used in this report. For the 2002 data set, *Taking Stock 2002* includes the following industry sectors:

- manufacturing (US SIC codes 20–39),
- coal mining,
- electric utilities,
- hazardous waste treatment and solvent recovery facilities.
- chemical wholesalers, and
- petroleum bulk terminals.

NPRI added reporting by petroleum bulk terminals starting with the 2002 reporting year. Therefore, for the 1998–2002 data set, all of the above industries except petroleum bulk terminals are included.

For the 1995–2002 data set, only manufacturing industries are included. This data set therefore, does not include coal mining, electric utilities, hazardous waste/solvent recovery facilities, chemical wholesalers and petroleum bulk terminals. Reporting from these sectors was required beginning in the 1998 reporting year in TRI.

Some sectors with significant releases and transfers, such as mining, are not included in this matched data set. The reporting criteria for the metal mining sector differ between TRI and NPRI. Under TRI, but not under NPRI, releases and other waste management activities of TRI chemicals in waste rock were reportable. Waste rock consists of barren or submarginal rock that is removed in order to gain access to the ore.

TRI facilities can use up to six SIC codes to identify the business activities or industry sectors associated with each reported chemical. A facility may use the same SIC codes on all its TRI forms or it may use different SIC codes to describe its industrial activities for various chemicals. For example, a petrochemical facility may indicate petroleum refining as the industrial activity associated with one chemical, while it reports chemical manufacturing for another. One chemical form will be analyzed with other forms in the petroleum refining sector and the second in chemical manufacturing sector. However, the facility itself—with the sum of all its reports—cannot be accounted as either a petroleum refinery or a chemical manufacturing plant for purposes of industrial sector-based analyses of TRI data. In the analyses in *Taking Stock*, such facilities will appear in the industry category called "multiple SIC codes." (See box for a list of US SIC codes included in the matched data sets.)

2.2.2 Matching for Chemicals

The matched data set includes only those substances on both the TRI and NPRI lists. NPRI covers over 260 chemical substances and TRI approximately 650. Over the years, PRTRs have added new chemicals and changed reporting requirements. To look at changes over time, it is necessary to select only those chemicals that have been consistently reported over time.

New for this year's report is the exclusion of arsenic and cadmium and their compounds in all matched data sets. The threshold for reporting arsenic and cadmium was lowered in NPRI for 2002 and so no longer matches the TRI threshold. In addition, lead and its compounds are included only in the 2002 data set. The threshold for reporting lead and its compounds was lowered by TRI (for 2001) and by NPRI (for 2002) so this chemical is included in the 2002 data set but not in data sets that include years prior to 2002.

All Matched Chemicals

The matched data set for 2002 includes 203 substances. Because of the additions and reporting changes, the two data sets (1995–2002 and 1998–2002) that look at changes over time both contain 153 chemicals. (See **Appendix B** for the list of chemicals.)

While certain chemicals may be reportable in both systems, they may be defined differently. For sulfuric acid and hydrochloric acid, for example, under TRI only aerosol forms are reportable; these are released only to air. All forms of these acids are reportable to NPRI. For comparing TRI and NPRI data then, the matched data set includes only air emissions of these two chemicals.

In addition, while ammonia and isopropyl alcohol appear on both lists, they are not included in the matched data set because the definition for these substances differs. Total ammonia is reportable to NPRI, while only 10 percent of aqueous forms of ammonia along with all anhydrous forms are reportable to TRI. Only forms of isopropyl alcohol manufactured by the strong acid process are

List of Industry Sectors Covered in the Matched Data Set of *Taking Stock 2002*

US SIC Code*	Industry
Manufacturing Industry Sectors	
20	Food Products
21	Tobacco Products
22	Textile Mill Products
23	Apparel and Other Textile Products
24	Lumber and Wood Products
25	Furniture and Fixtures
26	Paper Products
27	Printing and Publishing
28	Chemicals
29	Petroleum and Coal Products
30	Rubber and Plastics Products
31	Leather Products
32	Stone/Clay/Glass Products
33	Primary Metals
34	Fabricated Metals Products
35	Industrial Machinery
36	Electronic/Electrical Equipment
37	Transportation Equipment
38	Measurement/Photographic Instruments
39	Misc. Manufacturing Industries
--	Multiple codes 20–39**
TRI Industry Sectors that Match NPRI Reporting (Added for 1998 TRI Reporting)	
12	Coal Mining (except US SIC code 1241)
491/493	Electric Utilities (limited to those that combust coal and/or oil, US SIC codes 4911, 4931 and 4939)
7389/4953	Hazardous Waste Treatment and Disposal/Solvent Recovery (US SIC codes 4953 and 7389)
5169	Chemical Wholesalers
5171	Petroleum Bulk Terminals (added for 2002 NPRI reporting)

* US SIC codes are used because NPRI facillities report both the Canadian SIC code and the equivalent US SIC code and TRI facilities report only the US Sic codes.
** Multiple SIC codes are reported only by TRI facilities.

Reporting of Ammonia

As in previous years, the substance ammonia is not included in the analyses in this report. While facilities in both countries must report on ammonia, TRI facilities determine their threshold for reporting and report amounts based on 100 percent of anhydrous ammonia and 10 percent of total aqueous ammonia in use or manufactured at their site. Canadian facilities, on the other hand, determine their threshold and report based on 100 percent of total ammonia, anhydrous and aqueous.

After discussions with governmental representatives, ammonia is not included in the matched chemical set and, hence, this *Taking Stock* report for two reasons:

1) Differences in reporting threshold means it is not possible to account for those facilities not reporting under TRI:

For example, if we imagine a facility that releases 8 tonnes of ammonia to air and 10 tonnes to water: under the NPRI system, this facility would calculate the reporting threshold as: 10+8 = 18 tonnes of ammonia. The facility would have to report its releases to NPRI since they are above the 10-tonne reporting threshold. However, under the TRI system, this same facility would calculate the reporting threshold as: 8+1 = 9 tonnes (8 tonnes to air plus 10 percent of 10 tonnes to water). The facility would not report since its releases are below the reporting 11-tonne (25,000 pounds) reporting threshold.

2) Differences in amount reported:

For example, take a facility that releases 10 tonnes to air and 50 tonnes to water. Under NPRI, this facility would report: 10+50 = 60 tonnes of ammonia released. But under TRI, this same facility would report: 10 tonnes to air plus 10 percent of 50 tonnes to water 10+5 = 15 tonnes of ammonia released.

In short, the same facility would report four times more ammonia under NPRI than it would under TRI. Therefore, because of the differences in reporting, ammonia is not included in the matched list of chemicals in *Taking Stock*.

reportable to TRI, while all forms are reportable to NPRI.

TRI facilities report separately for certain chemicals and their compounds, while in NPRI, a chemical and its compounds count as one category. For example, TRI lists both nickel and nickel compounds, counting them as two separate substances, while NPRI lists the single category, nickel and its compounds. All the analyses in *Taking Stock 2002* add the TRI amount reported for the given chemical to the amount reported for its compounds, to correspond with NPRI practice. Ammonia is a substance reported in large quantities to both NPRI and TRI, accounting for 4 percent of total releases and transfers of toxic chemicals in NPRI and 7 percent in TRI.

2.2.3 Three Matched Data Sets: 2002, 1998–2002 and 1995–2002

Each country has added new requirements for additional chemicals and sectors over the years. Because of changes in NPRI and TRI over the years, *Taking Stock* has three "matched" data sets.

- The *2002 matched chemicals and industries* data set includes all matched industries, chemicals and types of transfers now reported to both NPRI and TRI. This data set includes 203 chemicals (**Chapters 4**, **5**, **8** and **9**).
- The *1998–2002 matched chemicals and industries* data set includes all industries except for petroleum bulk terminals and all types of transfers but does not include the new chemicals added to NPRI for 1999 or chemicals whose reporting definition has changed, such as mercury or lead and its compounds (**Chapters 6**, **8** and **9**). It is used for looking at changes from 1998 to 2002. This data set includes 153 chemicals.
- The *1995–2002 matched chemicals and industries* data set includes only manufacturing industries, only transfers to disposal, treatment, and sewage, and only chemicals reportable 1995 through 2002. It does not include TRI industries added for 1998 reporting, transfers to recycling or energy recovery, NPRI chemicals added for 1999 reporting, or chemicals whose reporting definition has changed, such as mercury or lead and its compounds (**Chapters 7** and **9**). It is used for eight-year trend analyses (1995–2002). This data set includes the same 153 chemicals.

For comparisons across years, 1995 is used as the base year. Environment Canada considers 1995 as a base year for NPRI, while EPA considers 1988 as a base year for TRI. TRI has also adopted 1995 as an additional baseline for tracking progress because more than 250 substances were added to the TRI list for reporting that year.

Subsets of Matched Chemicals

Chapter 9 presents data for two groups of chemicals with health effects: 1) known or suspected carcinogens and 2) chemicals that are linked to cancer, birth defects or other reproductive harm (California Proposition 65 chemicals). For two other groups of chemicals of concern that can be examined, metals and their compounds and Canadian Environmental Protection Act (CEPA) Toxics, see the *Taking Stock* web site at <http://www.cec.org/takingstock>. Using the query builder function, users can generate data reports that look specifically at these groups of substances, as well as the carcinogens and California Proposition chemicals examined in this report.

A chemical on the matched chemical list is included as a known or suspected carcinogen if it is listed by the International Agency for Research on Cancer (IARC) <http://www.iarc.fr/> or by the US National Toxicology Program (NTP) <http://ntp-server.niehs.nih.gov />. Substances classified under IARC as carcinogenic to humans (Group 1), probably carcinogenic to humans (Group 2A), and possibly carcinogenic to humans (Group 2B) are included. Under the US National Toxicology Program, substances are classified as known to be carcinogenic or may reasonably be anticipated to be carcinogenic. Of the 203 chemicals in the 2002 matched data set, 55 are known or suspected carcinogens.

California's Safe Drinking Water and Toxic Enforcement Act of 1986 (enacted after voters' approval of Proposition 65) requires the publication of a list of chemicals that are known to the state of California to cause cancer, birth defects or other reproductive harm (found online at <http://www.oehha.ca.gov/prop65/prop65_list/files/070904list.html>). As of July 2004, the list contained almost 700 substances, of which 77 are in the 2002 matched data set.

Three chemicals (arsenic, cadmium and chromium and their compounds) are no longer included in the analyses in **Chapter 9**. Arsenic and cadmium and their compounds are no longer in the matched data set because NPRI lowered the reporting threshold for the entire categories of these substances from 10 tonnes to 50 kg manufactured, processed or otherwise used in a calendar year. TRI reporting remains at the higher threshold so the substances are no longer comparable. Chromium and its compounds are not included as a carcinogen or as a California Proposition 65 chemicals because they are no longer reported as a single category under NPRI. NPRI reports on hexavalent chromium (the chromium compound which is carcinogenic) separately from other chromium compounds. Under TRI, all chromium compounds are reported as a single amount.

2.2.4 Results of Matching for Industries and Chemicals

In 2002, 3,260 Canadian facilities in all industries reported 1.69 billion kg of releases and transfers to NPRI, and the 24,379 United States facilities reported 3.75 billion kg of releases and transfers. However, not all of these reports match the reporting in the other country.

Note that NPRI added reporting on criteria air contaminants for 2002. This section is based on facilities reporting on toxic chemicals and so excludes facilities that reported only on criteria air contaminants. (See **Chapter 3** for reporting on criteria air contaminants.)

In 2002, Canadian facilities in the matched industry sectors reported 149.2 million kg of releases and transfers for substances reportable to NPRI but not covered in TRI—or reportable in both systems but defined differently. These reports were eliminated from the matched data set ("excluded due to chemical only"). Canadian facilities in industry sectors not in the matched data set reported 117.6 million kg of releases and transfers for substances covered in both PRTRs ("excluded due to industry only"). In addition, some reports in the NPRI database fell into both categories ("excluded due to both industry and chemical"), and their 1.07 billion kg of total releases and transfers were also excluded.

In TRI, matching for common chemicals eliminated 256.0 million kg of releases and transfers. Matching for industries excluded a larger amount—425.1 million kg. The metal mining industry's reporting accounted for the vast majority of this amount. A total of 179.0 million kg was excluded because both the chemical and the industry were not comparable to NPRI.

Over half (55 percent) of the chemical reports under NPRI and 82 percent under TRI are included in the *Taking Stock* matched data set for 2002. These comparable reports represent 21 percent of NPRI total reported amounts and 77 percent of TRI amounts.

Table 2–1. All Releases and Transfers Reported to NPRI and TRI, 2002

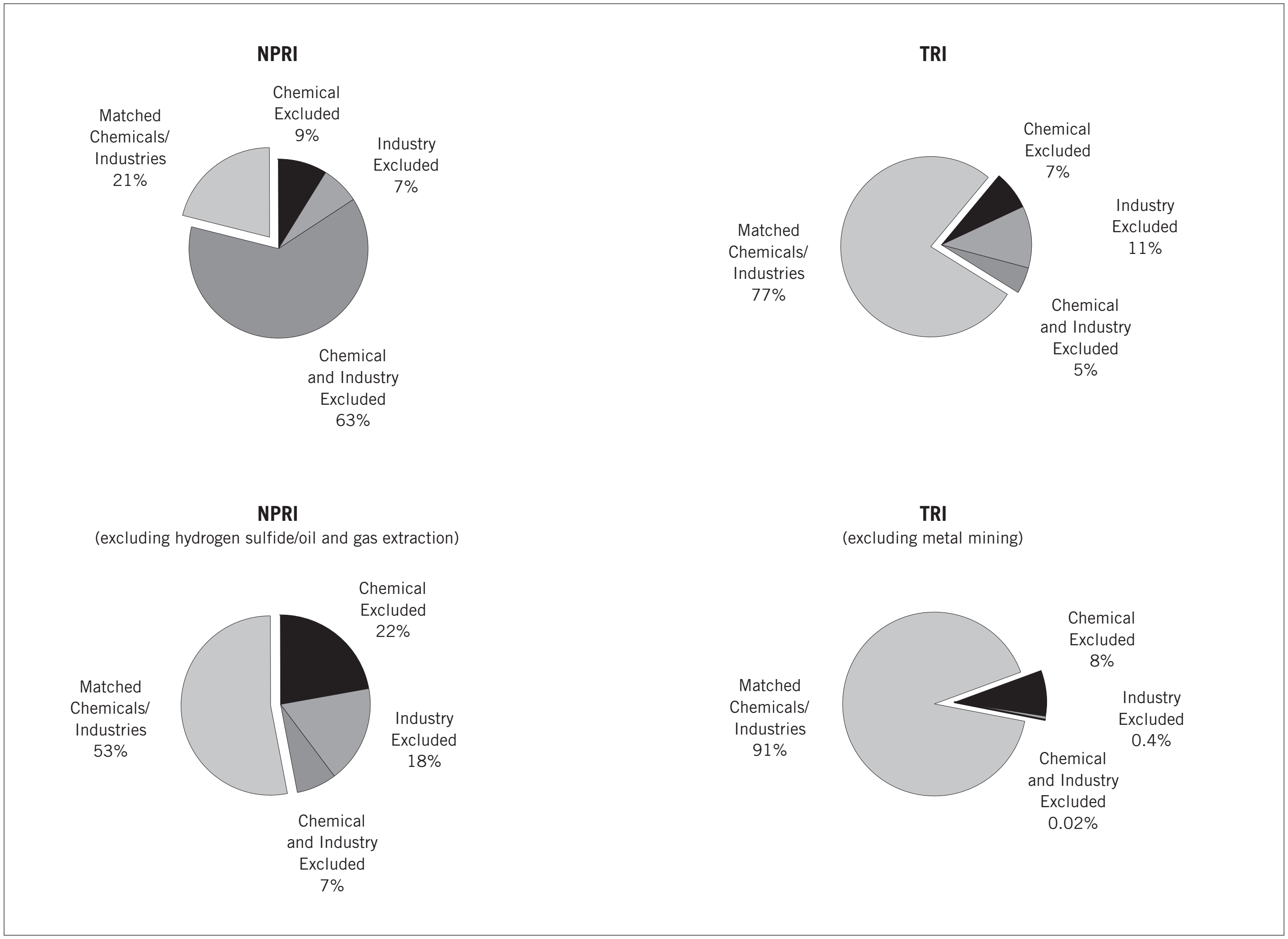
	NPRI* Number	TRI Number
Total Facilities	3,260	24,379
Total Forms	14,932	93,364
Releases On-site and Off-site	**kg**	**kg**
On-site Releases	**407,685,666**	**1,936,378,512**
Air	131,006,448	739,823,908
Surface Water	77,012,135	104,297,683
Underground Injection	167,004,303	100,833,372
Land	32,468,894	991,423,548
Off-site Releases	**48,846,755**	**271,524,045**
Transfers to Disposal (except metals)	20,518,724	26,489,365
Transfers of Metals**	28,328,031	245,034,679
Total Releases	**456,532,421**	**2,207,508,073**
Off-site Transfers for Further Management		
Off-site Transfers to Recycling	**1,184,931,727**	**900,534,272**
Transfers to Recycling of Metals	225,232,026	766,026,803
Transfers to Recycling (except metals)	959,699,701	134,507,470
Other Off-site Transfers for Further Management	**50,786,341**	**646,324,521**
Energy Recovery (except metals)	8,813,594	364,756,850
Treatment (except metals)	26,028,376	125,057,617
Sewage (except metals)	15,944,371	156,510,054
Total Reported Amounts of Releases and Transfers	**1,692,250,489**	**3,754,366,866**

Note: Canada and US data only. Mexico data not available for 2002. NPRI amounts do not include reports for criteria air contaminants.

* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI releases of less than 1 tonne may be reported as an aggregate amount. Does not include NPRI data for critieria air contaminants.

** Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

Figure 2–2. Percentage of Total Releases and Transfers Included/Excluded when Matching NPRI and TRI for Chemicals and Industries, 2002



The greatest portion of releases and transfers excluded from the 2002 matched data set were due to different types of reporting in NPRI and TRI.

- For NPRI, the exclusions were primarily due to reports from three natural gas extraction facilities belonging to one parent company that reported a total of 864.2 million kg of hydrogen sulfide. TRI includes neither the industry sector nor the chemical. These three reports accounted for 51 percent of the NPRI database for 2002.
- Ammonia is reported to both NPRI and TRI, but is not in the matched data set, as explained above, because of different reporting requirements. Releases and transfers of ammonia accounted for over 4 percent of NPRI and almost 7 percent of all TRI releases and transfers.
- Non-air releases and transfers of hydrochloric acid and sulfuric acid are also not included in the matched data set because non-aerosol forms of these chemicals are not required to be reported to TRI. Non-air releases and transfers from the matched industries accounted for 5 percent of the NPRI 2002 total.
- For TRI, the exclusions were primarily due to the type of industry. The metal mining sector, as explained above, is not included in the matched data set because of different reporting requirements. Metal mines reported 16 percent of all releases and transfers to TRI in 2002 (for chemicals in the matched data set).

2.2.5 Adjustment of Total Releases in North America

Facilities transfer chemicals to other facilities for disposal. These amounts are considered as off-site releases in *Taking Stock*. These other facilities (usually, hazardous waste management facilities) can dispose of the chemicals in on-site landfills or underground injection wells; if they are metals sent to wastewater treatment facilities, they may be discharged to surface waters. These are types of on-site releases.

Table 2–2. Creating the Matched Dataset for *Taking Stock 2002*: Effects of Matching NPRI and TRI for Chemicals and Industries, 2002

	NPRI*				TRI			
	Forms		Total Reported Amounts of Releases and Transfers		Forms		Total Reported Amounts of Releases and Transfers	
	Number	%	kg	%	Number	%	kg	%
Total in Individual Database	**14,932**	**100**	**1,692,250,489**	**100**	**93,364**	**100**	**3,754,366,866**	**100**
Excluded Due to Chemical Only	**3,750**	**25**	**149,216,107**	**9**	**15,441**	**17**	**255,960,892**	**7**
Chemicals with Differences in Reporting Definition								
Hydrochloric and sulfuric acid: non-air releases	417	3	89,530,719	5.29	231	0.25	2,036,957	0.05
Isopropyl alcohol	291	2	4,914,316	0.29	15	0.02	257,804	0.01
Ammonia	327	2	30,478,239	1.80	2,567	2.75	77,959,738	2.08
Arsenic and its compounds	148	1	728,522	0.04	544	0.58	9,961,001	0.27
Cadmium and its compounds	200	1	252,264	0.02	98	0.11	2,203,258	0.06
Dioxins/furans	309	2	0	0.00	1,254	1.34	0	0.00
PAHs	1,131	8	565,931	0.03	3,595	3.85	1,934,140	0.05
Hexachlorobenzene	304	2	445	0.00	94	0.10	36,148	0.00
Chemicals on one list but not on the other list	623	4	22,745,670	1.34	7,043	7.54	161,571,847	4.30
Excluded Due to Industry Only	**1,763**	**12**	**117,578,887**	**7**	**1,307**	**1**	**425,076,855**	**11**
Metal Mining	195	1	7,751,017	0.5	478	1	411,956,630	11
Other Industries	1,568	11	109,827,869	6	829	1	13,120,225	0.4
Excluded Due to Both Chemical and Industry	**797**	**5**	**1,068,379,877**	**63**	**221**	**0.24**	**179,029,117**	**5**
Hydrogen sulfide/Oil and gas extraction	77	0.5	1,020,582,460	60	NA	NA	NA	NA
Hydrochloric and sulfuric acid	104	0.7	4,612,751	0.27	34	0.04	413,727	0.01
Isopropyl alcohol	14	0.1	111,563	0.01	0	0.00	0	0.00
Ammonia	178	1.2	42,147,350	2.49	50	0.05	791,953	0.02
Arsenic and its compounds	64	0.4	270,596	0.02	20	0.02	174,306,138	4.64
Cadmium and its compounds	81	0.5	336,180	0.02	15	0.02	1,254,037	0.03
Dioxins/furans	37	0.2	0	0.00	18	0.02	0	0.00
PAHs	140	0.9	2,044	0.00	27	0.03	1,994	0.00
Hexachlorobenzene	38	0.3	7	0.00	0	0.00	0	0.00
Chemicals on one list but not on the other list	64	0.4	316,927	0.02	57	0.06	2,261,267	0.06
Excluded Due to Number of Employees Only	**379**	**3**	**1,192,148**	**0.1**	**NA**	**NA**	**NA**	**NA**
Total for Matched Chemicals/Industries	**8,243**	**55**	**355,883,470**	**21**	**76,411**	**82**	**2,894,300,002**	**77**

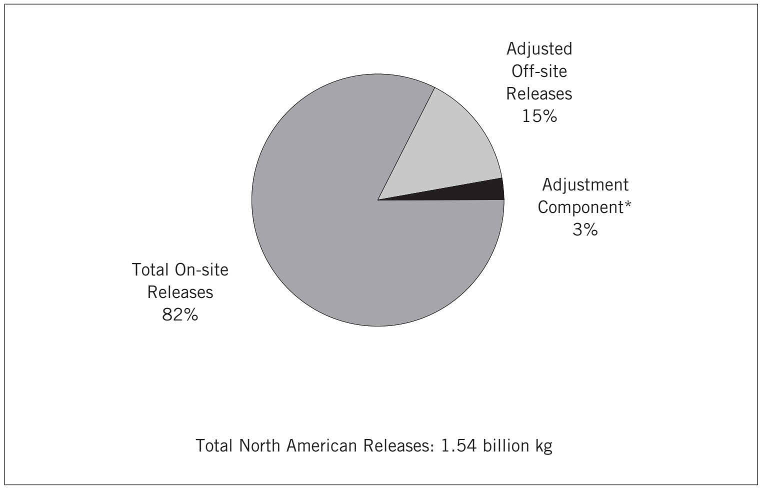
NA = not available
* Does not include forms for criteria air contaminants.

Table 2–3. Effect of Adjustment in Off-site Releases on North American Total Releases, NPRI and TRI, 2002

Releases On- and Off-site	North America kg		%	NPRI* kg		%	TRI kg		%
Total On-site Releases	**1,273,863,312**		**85**	**116,679,060**		**81**	**1,157,184,252**		**85**
Total Reported Off-site Releases	**269,421,125**			**30,299,918**			**239,121,207**		
Adjustment Component (Off-site Transfers to Disposal Reported as On-site Release by Other NPRI or TRI Facilities)	41,028,398	(15% of total reported off-site releases)		3,780,286	(12% of total reported off-site releases)		37,248,112	(16% of total reported off-site releases)	
Adjusted Off-site Releases*	**228,392,727**		**15**	**26,519,632**		**19**	**201,873,094**		**15**
Total Adjusted Releases*	**1,502,256,039**		**100**	**143,198,692**		**100**	**1,359,057,347**		**100**

Note: Canada and US data only. Mexico data not available for 2002.
* Adjusted to exclude off-site releases reported as on-site releaess by other NPRI or TRI facilities.

Figure 2–3. Effect of Adjustment in Off-site Releases on North American Total Releases, 2002



Note: Canada and US data only. Mexico data not available for 2002.
* Amount of off-site transfers to disposal reported as on-site releases by other NPRI or TRI facilities.

Therefore, one facility may report chemicals as off-site releases (sent off-site for disposal) while another facility reports the same quantity as an on-site release. With the inclusion of hazardous waste management facilities in the matched data set (beginning with the 1998 reporting year), such on-site releases are now included as well. When considering total releases, an adjustment should be made so that the release is only counted once.

The 2002 data were analyzed to determine the amount of off-site releases that were also reported as on-site releases at another facility (see **Table 2-3** and **Figure 2-3**). In all, 3.8 million kg of off-site releases in NPRI (of the total reported off-site releases of 30.3 million kg, or 12 percent) and 37.2 million kg of off-site releases in TRI (of the total reported off-site releases of 239.1 million kg, or 16 percent) were found to match up with on-site releases also reported for 2002 by facilities in North America.

Why are there these differences between the amounts reported as sent off-site for disposal and the amounts reported as disposed of on-site? There are several reasons why off-site releases may not be reported as on-site releases: the transfer site may not have met the thresholds or other reporting criteria for reporting that chemical, the transfer site may not have reported when it should have, the facility may have reported the ultimate disposition of the waste incorrectly, or the transfer amount may have actually been disposed of in a different calendar year. In addition, since matching was based largely on names and addresses of transfer sites, matches may have been missed in the analysis.

Releases are not adjusted when the analysis focuses on total reported releases and transfers (see **Chapter 4**) because the purpose of such an analysis is to present the total amounts of the chemicals that are managed by the facilities. Other chapters (**Chapters 7** and **8**) also do not include an adjustment analysis because they deal with other types of transfers than transfers to disposal or they deal with data prior to 1998 and hazardous waste facilities are not included in such data.

2.2.6 Matched Data Online

Two of the products of the CEC PRTR program are the development of the annual *Taking Stock* reports and *Taking Stock Online* web site (<http://www.cec.org/takingstock/>) which allows online queries of the matched data set. The *Taking Stock Online* query builder allows for searches of the database to answer customized questions about chemicals, special groups of chemicals, industry sectors, facilities and time trends.

Query Builder

http://www.cec.org/takingstock/

To obtain a summary of the releases and transfers that facilities reported to NPRI and TRI using *Taking Stock Online*:

1. select **Country** report.
2. select the **year 2002**.
3. select **Canada & USA** for the geographic area,
   select **All chemicals** for the chemical,
   select **All industries** for the industrial sector.
4. check all boxes.

Then click on **✓Run the query**

Throughout *Taking Stock 2002*, each table and figure indicates which data set is in use. Because the data sets contain different elements, the data sets may yield different results. Only tables and figures based on the same data set can be meaningfully compared with one another. While the online web site query builder automatically accesses the data set for the time period chosen, it is important to keep in mind which data set was used when looking at the query results.

Facilities that report to PRTRs are free to revise their previous years' submissions at any time. They may correct previous errors, or they may re-calculate earlier years' data using a different estimation method. Thus, some of the data in previous editions of *Taking Stock* may have been revised. Readers should use the current report or the current databases (available online at <http://www.cec.org/takingstock/>).

Ongoing Development of *Taking Stock* Reports and Matched Data Set Online

From the beginning, public feedback has been an essential component of the report and web site development process. Although comments on the project are welcome at any time, the formal public consultative process includes:

- Distribution of a discussion paper to members of the Consultative Group outlining options for the upcoming report. The Consultative Group includes representatives of industry, government, public interest and environmental groups and other interested parties from all three countries.
- Convening of a public meeting of the Consultative Group during which stakeholders have the opportunity to discuss the options for the upcoming report and to provide input on other relevant aspects of the North American PRTR Project.
- Receipt of written comments from members of the Consultative Group and other interested individuals and organizations.
- Preparation and dissemination of a "Response to Comments" based on the written and verbal comments received and explaining how CEC plans to incorporate the comments into the report and web site.

If you are interested in participating in the consultative process, please contact:

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3

Criteria Air Contaminants

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Key Findings

- Air releases of criteria air contaminants contribute to environmental issues such as smog, acid rain, regional haze, and nutrient loading and to health effects such as stroke, heart attack, respiratory illness, including asthma, bronchitis and emphysema, and premature mortality.
- The Canadian NPRI added reporting on criteria air contaminants for the 2002 reporting year. The Mexican COA has mandatory reporting for three of the criteria air contaminants on the NPRI list. The United States has a preliminary draft National Emissions Inventory (NEI) for criteria air contaminants for 2002.
- Comparable criteria air contaminants data from Canada and the United States include data on carbon monoxide, nitrogen oxides, particulate matter, sulfur dioxide and volatile organic compounds. Comparable data from all three countries include nitrogen oxides, sulfur dioxide and volatile organic compounds.
- Comparable data from the countries' databases are selected based on the US NEI thresholds, which are higher than reporting in Canada and Mexico. For the three-country analysis, further selection is based on the industry sectors required to report to the Mexican COA.
- While these databases contain information on air releases of criteria air contaminants from industrial sources, there may be differences in methodology between them. For example, estimation methods for specific sectors may differ, threshold for reporting differ, and classification of industrial sectors may differ. However, they are the best available sources for facility-specific information about criteria air contaminants in 2002.
- Selection of comparable data results in small numbers of facilities from the three databases, but captures the majority of the air releases for most of the substances. The exception is volatile organic compounds, where less than half of the emissions are captured in Canada and the United States.
- However, the data are only from industrial sources. For some of the criteria air contaminants, other sources such as transportation vehicles, construction sites, open burning, and agricultural activities are much larger sources than industrial facilities.

3.1 Introduction

In 2002, for the first time, NPRI required reporting of a set of pollutants known as the criteria air contaminants. These pollutants are important as they contribute to environmental issues, such as smog, acid rain, regional haze, and nutrient loading (eutrophication), and to human health effects, such as stroke, heart attack, respiratory illness, including asthma, bronchitis and emphysema, and premature mortality.

This addition of criteria air contaminants creates a new opportunity for the *Taking Stock* report. At the CEC's PRTR Consultative meeting in October 2003 in Alexandria, Virginia, United States, there was widespread support for including an analysis of criteria air contaminants in the report. Therefore, this chapter first provides a brief description of the characteristics, sources and health and environmental effects of criteria air contaminants and then presents analyses of CAC data. The analyses use 2002 NPRI data, data from the preliminary draft US National Emissions Inventory for 2002 (from February 2005), and 2002 data from the Mexican Annual Certificate of Operation (*Cédula de Operación Anual*—COA), Section 2.

The criteria air contaminants discussed in this report include (in alphabetical order):

- carbon monoxide,
- nitrogen oxides (nitric oxide and nitrogen dioxide),
- particulate matter (total PM, PM_{10}, and $PM_{2.5}$),
- sulfur dioxide, and
- volatile organic compounds.

The term "criteria air contaminant" is typically defined by law, regulation or program, and so the specific chemicals considered a criteria air contaminant vary among Canada, Mexico and the United States. For example, in the United States, lead and ozone are considered criteria air contaminants (CACs). For this report, the term "criteria air contaminant" refers to the pollutants listed above which are required to be reported as criteria air contaminants under NPRI.

There are some important differences between reporting of CACs and toxics. Only air emissions are reported for CACs, compared to the air, water, land and transfer data reported for toxics. The reporting threshold for CACs is based on releases, not the "manufactured, processed or otherwise used" thresholds applied for toxic reporting. CACs tend to be reported in much larger quantities, in millions of tonnes, compared to the smaller quantities for many toxics that are reported in tonnes or even kilograms.

3.1.1 Health and Environmental Effects and Sources of Criteria Air Contaminants

Each criteria air contaminant has specific environmental and health effects, some of which are indicated in **Box 3–1**.

For more information on the health or environmental effects, please refer to the following sections on each substance and the following sites for country-specific information:

Canada

- Environment Canada site at <http://www.ec.gc.ca/air/introduction_e.cfm>

Mexico (INE).

- <http://www.ine.gob.mx/dgicurg/sqre/universo.html> (general information on chemicals and ecotoxicological effects).
- <http://www.ine.gob.mx/cenica/dieca-listado.html> (list of publications on air pollution and related topics, not substance-specific).

United States

- US Environmental Protection Agency site at <http://www.epa.gov/ebtpages/airairpocriteriaairpollutants.html>.

Canada and the United States have each developed a national inventory of criteria air contaminants. This provides an overview of the sources and amounts of each CAC. Mexico is developing a national inventory, with several regional and city inventories already developed.

Criteria air contaminants are emitted from a variety of sources including fuel combustion, industrial processes, vehicles (mobile sources), and agricultural activities (see **Box 3–2**.)

Box 3–1. Health and Environmental Effects of Criteria Air Contaminants

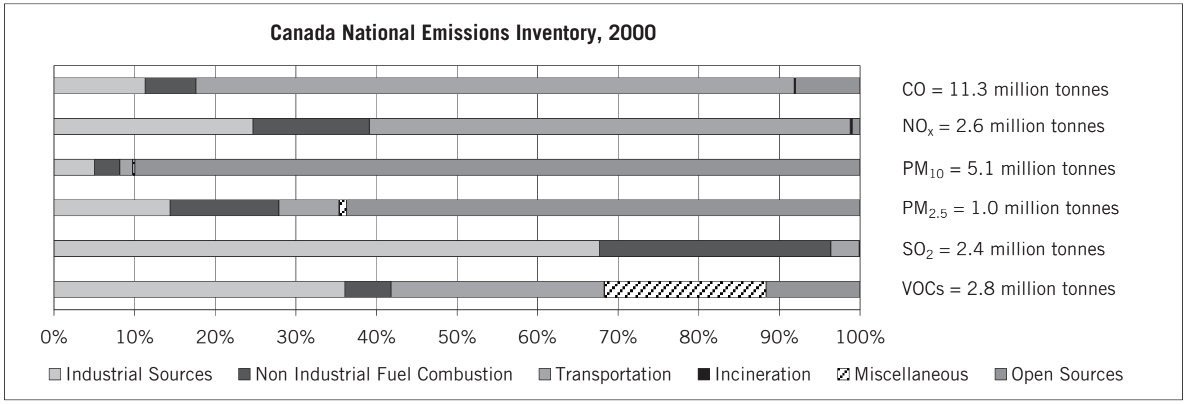
	Health effects	Smog	Acid rain	Visibility/ Haze	Odor	Other
Carbon monoxide	√	√				
Nitrogen oxides	√	√	√	√		Eutrophication
Particulates	√	√	√	√	√	
Sulfur dioxide	√	√	√	√		
Volatile Organic Compounds	√	√		√	√	

Adapted from Ontario Ministry of the Environment, Air Quality in Ontario, 2002 Report, Government of Ontario, 2004.

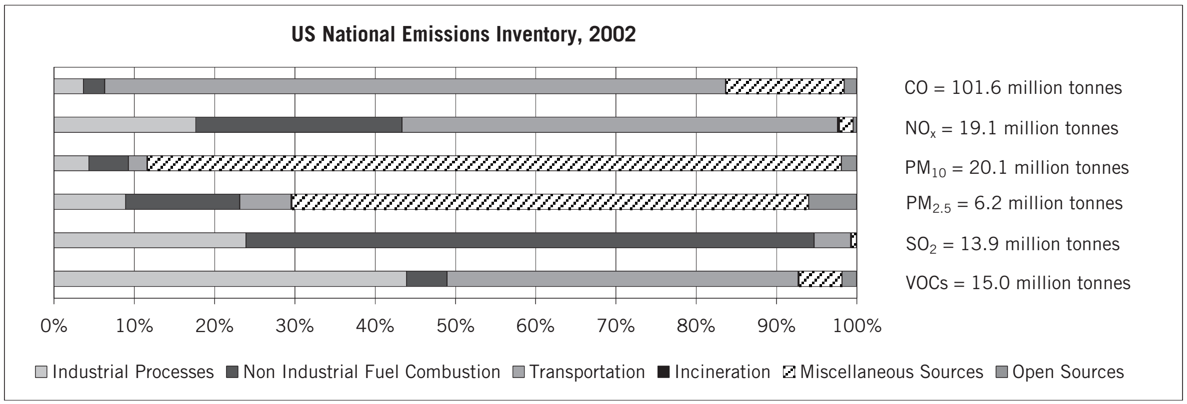
Box 3–2. Largest Sources of Criteria Air Contaminants

	Fuel Combustion	Industrial Sources	Mobile (Transportation) Sources	Other
Carbon monoxide			√	
Nitrogen oxides		√	√	
Particulates				√
Sulfur dioxide	√	√		
Volatile organic compounds	√	√		

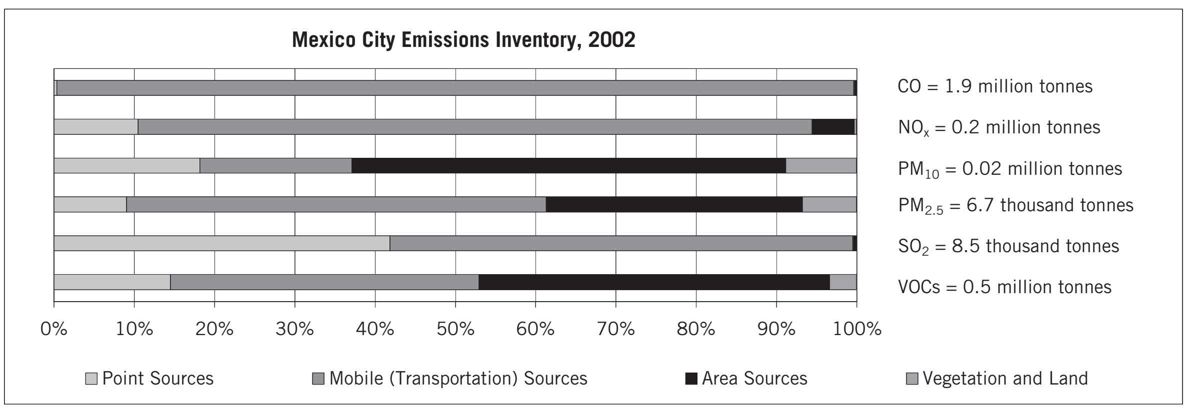
Figure 3–1. Summary of Sources of Criteria Air Contaminants



From Environment Canada, 2000 CAC Emission Summaries, December 2004, <http://www.ec.gc.ca/pdb/ape/ape_tables/canada2000_e.cfm>, accessed 25 January 2005.



From US Environmental Protection Agency, Air Pollutant Emissions Trends, <http://www.epa.gov/ttn/chief/trends/index.html>, accessed 12 February 2005.



From Table 3.3.1 in Inventario de Emisiones de la Zona Metropolitana del Valle de Mexico, Gobierno del Distrito Federal, 2004, <http://www.sma.df.gob.mx/bibliov/modules.php?name=News&file=article&sid=279>, preliminary report, accessed 10 January 2005.

Industrial and combustion processes are major sources of sulfur dioxide. Mobile sources, such as cars, trucks and off-road vehicles are major sources of volatile organic compounds and, in urban areas, for carbon monoxide. Both industrial and mobile sources contribute significantly to emissions of nitrogen oxides. Direct emissions of particulate matter (called primary particulate matter) more often come from other sources such as construction sites, unpaved roads, tilled fields, and wood burning. Sulfur dioxide, nitrogen oxides and volatile organic compounds can become secondary particulate matter, formed chemically in the atmosphere rather than emitted directly from a source. The amount of secondary particulate matter formed this way is not included in a national inventory, as it does not constitute direct emissions.

As shown in **Figure 3–1**, the sources contributing to the air emissions of the criteria air contaminants vary both by substance and by country. Further, there are differences among geographic regions such as urban areas and less densely populated areas. The Mexican data covering the urban area of Mexico City give one example.

3.1.2 Data Sources and Methodology

As the focus of this report is pollutant release and transfer data, the analyses in this chapter deal with industrial sources because most PRTR systems cover only industrial facilities. Since the US TRI does not collect data on criteria air contaminants we have used the data on industrial sources from the US National Emissions Inventory (NEI), which does cover these pollutants. States and other agencies collect information on industrial emissions and forward this with other data to create the national US NEI. The US data are from the preliminary draft data from the NEI for 2002, as of February 2005. These draft data are being reviewed by agencies, with a final version expected in December 2005. In Canada, most industrial sources are required to report directly to NPRI.

While the US NEI and NPRI both contain information on air releases of criteria air contaminants from industrial sources, there may be differences in methodology between them. For example, estimation methods for specific sectors, threshold for reporting and classification of industrial sectors may differ. However, they are the best available sources for facility-specific information about criteria air contaminants in 2002.

Matching CACs

Each country has a different list of substances that are considered to be criteria air contaminants. **Table 3–1** shows which substances are reported as criteria air contaminants in each country. Criteria air contaminants that were reported to the Canadian NPRI for the first time for the year 2002 include carbon monoxide, nitrogen oxides (reported as nitrogen dioxide), particulate matter (total particulate matter, PM_{10} and $PM_{2.5}$, filterable portion), sulfur dioxide, and volatile organic compounds. These are the substances that also are included in the US NEI. It does not, however, include data on total particulates so they are not included in the US-Canadian analyses.

For the comparison of data from all three countries, only nitrogen oxides, sulfur dioxides and volatile organic compounds are compared. Carbon monoxide reporting is voluntary in Mexico so it cannot be included in the three-country analyses.

Matching Industrial Sectors

In addition to matching substances for the analyses, industrial sectors must be matched. For comparisons of US and Canadian data, all industrial sectors reporting to NPRI and NEI are included, although a few industrial sectors (research laboratories) do not report to NPRI, and some facilities that report to NPRI could be considered area sources for US NEI purposes. For the three-country analyses, only those industrial sources from the Canadian NPRI and US NEI that match the 11 industry sectors reporting to the Mexican COA are included. These 11 industry sectors are: petroleum, chemical and petrochemical, paints and dyes, metallurgy (includes the iron and steel industry), automobile manufacture, cellulose and paper, cement and limestone, asbestos, glass, electric power generation, and hazardous waste management.

Table 3–1. Industry Specific Data Available on Criteria Air Contaminants

	Canada NPRI Covers all industrial sources above certain thresholds	US National Emissions Inventory Covers all industrial sources above certain thresholds	Mexico COA Section 2 Covers 11 industrial sectors	All Three Countries
Carbon monoxide	X	X	voluntary	
Nitrogen dioxide/Nitrogen oxides	X	X	X	X
Total Particulates	X		X	
Particulates (less than 10 microns)	filterable portion only	filterable and condensible separately reported		
Particulates (less than 2.5 microns)	filterable portion only	filterable and condensible separately reported		
Sulfur dioxide/Sulfur oxides	X	X	X	X
Volatile organic compounds	X	X	X	X
Unburned hydrocarbons			voluntary	

Note: Mexican COA, Section 2, also has voluntary reporting on carbon dioxide and the US considers lead to be a criteria air contaminant.

Table 3–2. Reporting Thresholds for Matched Canada-US Criteria Air Contaminants Data Set

Criteria Air Contaminant	Canadian NPRI Mass Reporting Threshold (Metric Tonnes)	US National Emissions Inventory Threshold	
		Tons	Metric Tonnes
Carbon monoxide	20	1,000	907.0
Nitrogen oxides	20	100	90.7
Particulates (less than 10 microns)	0.50	100	90.7
Particulates (less than 2.5 microns)	0.30	100	90.7
Sulfur dioxide	20	100	90.7
Volatile organic compounds	10	100	90.7

Note: Total particulates are reported to Canadian NPRI with a 20 tonnes threshold, but are not reported to US NEI.

Table 3–3. Canada-Mexico-US Matched Criteria Air Contaminant Data Set

Chemicals	Thresholds (based on US NEI)
Nitrogen Oxides	100 tons (90.7 metric tonnes)
Sulfur Dioxide	100 tons (90.7 metric tonnes)
Volatile Organic Compounds	100 tons (90.7 metric tonnes)
Industrial Sectors	Oil and gas extraction, petroleum refining, chemical and petrochemical, paints and dyes, metallurgy (includes the iron and steel industry), automobile manufacture, cellulose and paper, cement and limestone, asbestos, glass, electric power generation, and hazardous waste management.

Note: Mexican COA does not have reporting thresholds based on amount of release, rather only certain industrial sectors report to the federal COA.

Matching Thresholds

A final element that must be matched is reporting thresholds (amount of air releases). A facility is required to report to NPRI if it releases more than a certain amount. Similarly, facilities are included in US NEI if they release more than a certain amount. However these amounts, called reporting thresholds, are quite different between NPRI and US NEI: they are much higher in the US NEI. To make the data comparable, a facility is included in this analysis only if the release is above the US NEI reporting thresholds (see **Table 3–2**). For example, while the reporting threshold for NPRI facilities is 20 tonnes for carbon monoxide (i.e., if a facility releases 20 tonnes or more per year of carbon monoxide, it must report its total air releases to NPRI), for the US NEI the threshold is 1,000 tons (equivalent to 907 metric tonnes). Thus, facilities with less than 907 tonnes in the Canadian NPRI are not included in the following analyses because they would not have been included in the US NEI. It should also be noted that some US states include reporting at different thresholds than the federal one, so not all reporting in the United States is above the relevant federal threshold. Thus, US facilities with amounts below the thresholds in the US NEI are also not included.

In order to create a comparable "matched" data set from the US and Canadian data, then, for each substance, only those facilities reporting air emissions equal to or greater than the US NEI threshold for the particular substance are included. And, only six substances that are in both databases are analyzed (see **Table 3–2**).

For the three-country analysis, this "matched" set of facilities is further reduced. Only facilities in the Canadian NPRI and US NEI within the 11 industry sectors required to report to the Mexican COA are included. Only the Mexican facilities that reported air emissions equal to or greater than the US NEI threshold for the particular substance are included. And, only reports for the three substances on all three lists are analyzed (see **Table 3–3**).

Results for Canada-US Analysis

For 2002, a total of 3,122 facilities reported releases of criteria air contaminants to NPRI. The US NEI included 59,641 facilities in 2002.

Applying the US national thresholds results in matched data reports for 963 Canadian NPRI facilities (31 percent of the 3,122 facilities reporting) and 6,334 US NEI facilities (11 percent of the 59,641 facilities reporting). While the data matched on thresholds do not include the majority of facilities, they do include the majority of the amounts reported. For example, the amounts covered range from about 62 percent of US NEI total for volatile organic compounds, 79 percent of the Canadian NPRI totals for particulate matter less than 2.5 micrometers (microns), to 89 percent or more for sulfur dioxide in both countries.

Table 3–4. Reporting on Criteria Air Contaminants, NPRI and US NEI, 2002

Canada	At NPRI Threshold Levels		NPRI at US Threshold Levels			
	Facilities	Total	Facilities	Total	Total at US Threshold Levels	
	Forms	Air Releases	Forms	Air Releases	Facilities	Metric Tonnes
Criteria Air Contaminant	Number	Metric Tonnes	Number	Metric Tonnes	(%)	(%)
Carbon monoxide	1,142	953,721	143	836,151	13	88
Nitrogen oxides	1,159	576,739	532	555,664	46	96
PM - Total Particulate Matter	1,066	227,900	--	--	--	--
PM_{10} - Particulate Matter ≤10 Microns (filterable portion)	2,033	108,889	194	92,107	10	85
$PM_{2.5}$ - Particulate Matter ≤2.5 Microns (filterable portion)	1,903	61,150	139	48,339	7	79
Sulfur dioxide	668	1,978,935	334	1,973,702	50	99.7
Volatile Organic Compounds (VOCs)	1,588	267,553	489	237,359	31	89
Total Facilities	**3,122**		**963**		**31**	

United States	All US National Emissions Inventory*		National Emissions Inventory* at US Thresholds			
	Facilities	Total	Facilities	Total	Total at US Threshold Levels	
	Forms	Air Releases	Forms	Air Releases	Facilities	Metric Tonnes
Criteria Air Contaminant	Number	Metric Tonnes	Number	Metric Tonnes	(%)	(%)
Carbon monoxide	29,778	3,857,752	530	2,534,884	2	66
Nitrogen oxides	30,515	7,111,576	3,952	6,197,995	13	87
PM - Total Particulate Matter	--	--	--	--	--	--
PM_{10} - Particulate Matter ≤10 Microns (filterable portion)	9,921	241,573	435	175,955	4	73
$PM_{2.5}$ - Particulate Matter ≤2.5 Microns (filterable portion)	8,494	120,813	245	80,607	3	67
Sulfur dioxide	25,060	12,902,031	2,014	11,487,891	8	89
Volatile Organic Compounds (VOCs)	48,603	1,521,826	2,663	946,225	5	62
Total Facilities	**59,641**		**6,334**		**11**	

* Preliminary draft data from National Emissions Inventory as of February 2005.

Table 3–5. Reporting on Criteria Air Contaminants, Canadian NPRI, Mexican COA and US NEI, 2002

Canada	At NPRI Threshold Levels		NPRI at US Threshold Levels and Mexican Industry Sectors			
					Total at US Threshold Levels	
Criteria Air Contaminant	Facilities Forms Number	Total Air Releases Metric Tonnes	Facilities Forms Number	Total Air Releases Metric Tonnes	Facilities (%)	Metric Tonnes (%)
Nitrogen Oxides	1,159	576,739	450	523,259	39	91
Sulfur Dioxide	668	1,978,935	283	1,938,990	42	98
Volatile Organic Compounds	1,588	267,553	250	131,417	16	49
Total Facilities	**3,122**		**918**		**29**	

Mexico	All Mexican COA		Mexican COA at US Thresholds			
					Total at US Threshold Levels	
Criteria Air Contaminant	Facilities Forms Number	Total Air Releases Metric Tonnes	Facilities Forms Number	Total Air Releases Metric Tonnes	Facilities (%)	Metric Tonnes (%)
Nitrogen Oxides	944	3,362,532	209	3,355,579	22	99.8
Sulfur Dioxide	801	2,130,471	136	2,125,906	17	99.8
Volatile Organic Compounds	512	52,291	57	47,380	11	90.6
Total Facilities	**1,262**		**320**		**25**	

United States	All US National Emissions Inventory*		National Emissions Inventory* at US Thresholds and Mexican Industry Sectors			
					Total at US Threshold Levels	
Criteria Air Contaminant	Facilities Forms Number	Total Air Releases Metric Tonnes	Facilities Forms Number	Total Air Releases Metric Tonnes	Facilities (%)	Metric Tonnes (%)
Nitrogen Oxides	30,515	7,111,576	3,415	5,963,676	11	84
Sulfur Dioxide	25,060	12,902,031	1,656	11,219,357	7	87
Volatile Organic Compounds	48,603	1,521,826	1,380	564,549	3	37
Total Facilities	**51,210**		**4,496**		**9**	

* Preliminary draft data from National Emissions Inventory as of February 2005.

Results for Three-Country Analysis

The Mexican COA has required reporting for industrial facilities from 11 sectors on nitrogen oxides, total particulates, sulfur dioxide and volatile organic compounds. The facilities can also voluntarily report on carbon monoxide, carbon dioxide and unburned hydrocarbons. For 2002, 1,262 Mexican facilities reported on nitrogen oxides, sulfur dioxide and/or volatile organic compounds (the three criteria air contaminants that have mandatory reporting and are similar to reporting in Canada and the United States). Applying the US national thresholds results in matched data reports for 320 Mexican facilities.

The Canadian NPRI data for these three criteria air contaminants come from 3,122 facilities. Applying both the US NEI thresholds and the Mexican industry sectors results in data from 918 of the 3,122 facilities. The US NEI data for these three criteria air contaminants come from 51,210 facilities. Applying both the US NEI thresholds and the Mexican industry sectors results in data from 4,496 of the 51,210 facilities. While the data matched on thresholds and industry sectors do not include the majority of facilities, they do include the majority of the amounts reported for nitrogen oxides and sulfur dioxide. For volatile organic compounds, less than half of the amounts reported are included in both the Canadian NPRI data and the US NEI data.

3.2 Sources, Health and Environmental Effects and Data on Industrial Sources of Individual Criteria Air Contaminants

3.2.1 Carbon Monoxide (CO)

Carbon monoxide is a colorless, odorless and poisonous gas. When fuel is burned incompletely, carbon monoxide often results.

Main Sources

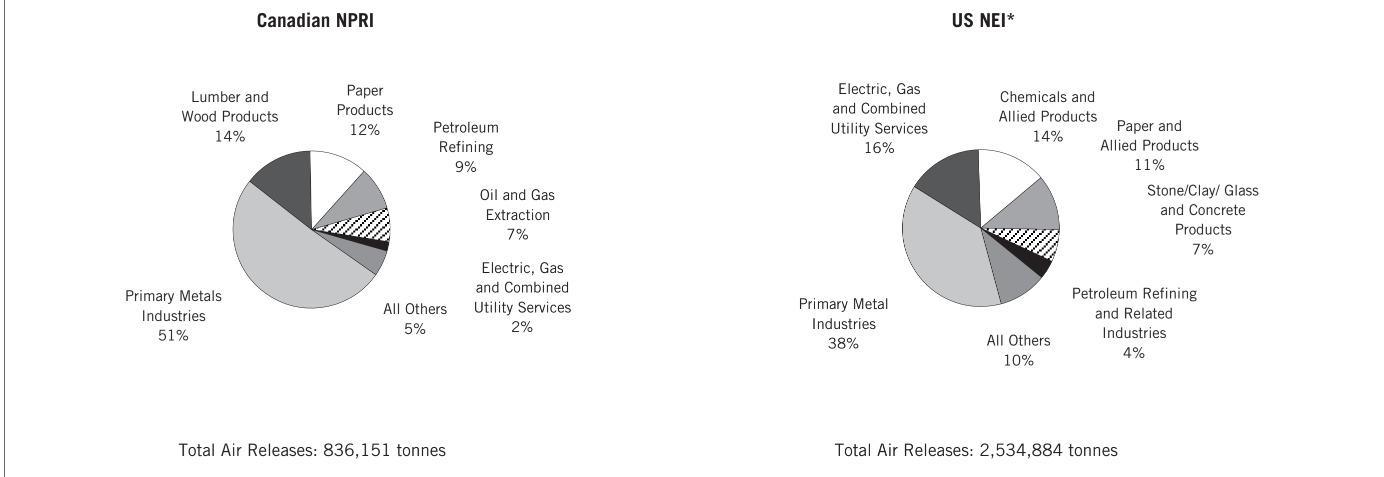
The majority of carbon monoxide is emitted from vehicles (including cars, trucks and construction equipment), with smaller amounts from fuel combustion, wood burning stoves and industrial processes such as metal and chemical manufacturing (EPA 2003).

In the United States, industrial sources, including fuel combustion, accounted for 6 percent of carbon monoxide air emissions in 2002. Transportation, including on-road vehicles such as automobiles, trucks and buses and off-road vehicles, such as construction equipment, accounted for 77 percent. In Canada, industrial sources and fuel combustion accounted for 16 percent of carbon monoxide air emissions in 2000 while transportation vehicles accounted for 74 percent. Open sources, such as open burning, unpaved roads or construction sites, accounted for 8 percent. In the Mexico City inventory for 2002, 99 percent of carbon monoxide emissions came from mobile sources (transportation vehicles) (see **Figure 3-1** above). This is due to the fact that fuel oil combustion is prohibited in the Metropolitan Zone of Mexico city, so that industrial combustion processes use mostly LPG and natural gas, and carbon monoxide is mainly a product of incomplete combustion of liquid and solid fuels.

Health and Environmental Effects

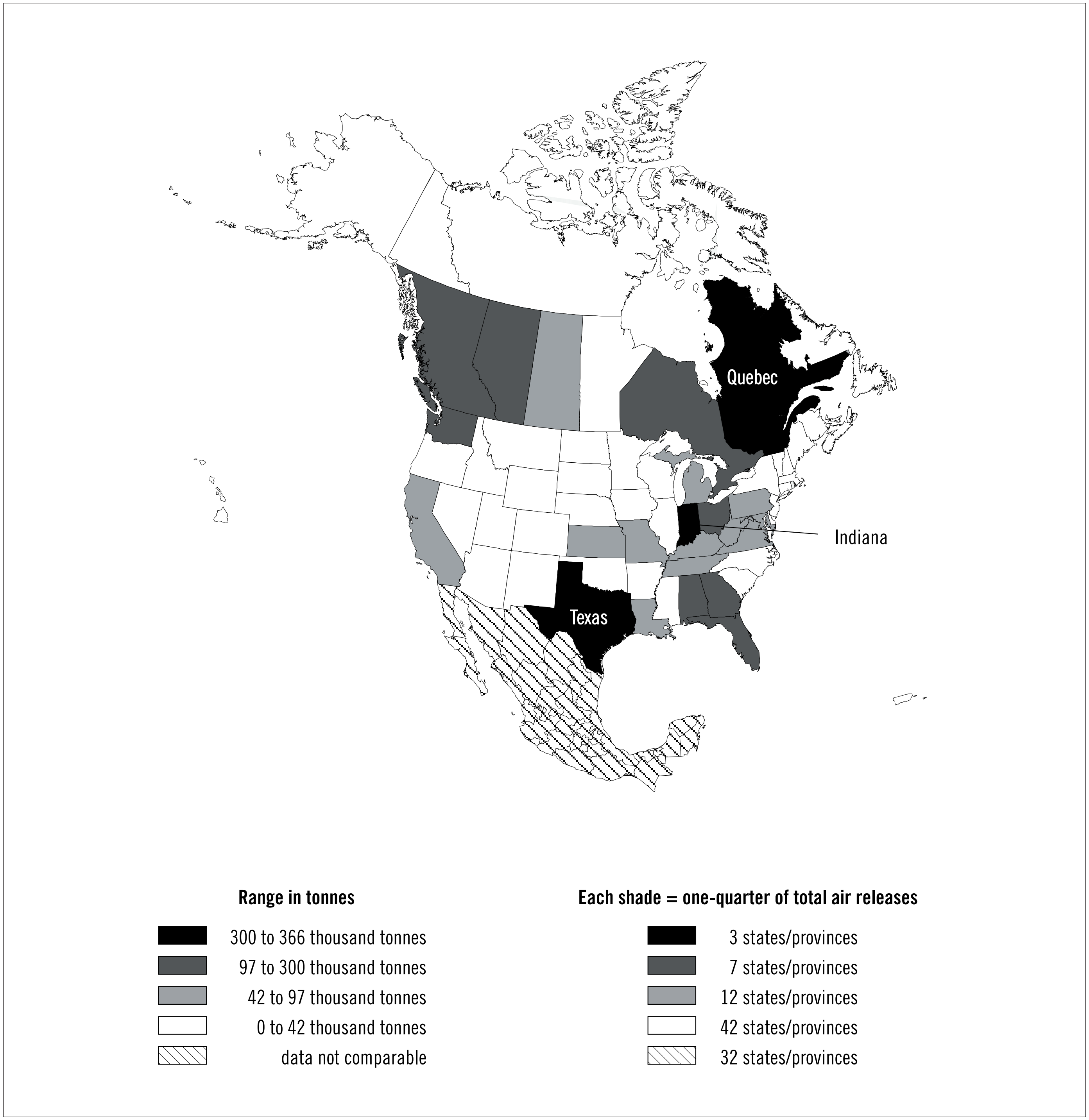
Carbon monoxide enters the blood and reduces the delivery of oxygen to the organs and tissues. Exposure to high levels of carbon monoxide has been linked to impaired

Figure 3–2. Air Releases, Canadian NPRI and US NEI, by Industry, 2002: Carbon Monoxide



Note: Facilities with air releases equal to or greater than US NEI threshold of 1,000 tons (907.0 tonnes).
* Preliminary draft data from US National Emissions Inventory as of February 2005.

Map 3–1. Largest Industrial Sources of Air Releases, Canada and US, 2002: Carbon Monoxide



vision, decreased work capacity, decreased learning ability and decreased performance of difficult tasks (OMOE 2004). The health risk from lower levels of carbon monoxide is most serious for those who suffer from heart disease, who may have chest pain and reduced ability to exercise; repeated exposures may contribute to other cardiovascular effects. Carbon monoxide can also contribute to the formation of smog (EPA 2003).

2002 Data on Air Releases from Industrial Sources in Canada and the United States

The threshold for reporting carbon monoxide to NPRI is 20 metric tonnes, and for reporting to the US NEI it is 1,000 tons (907 metric tonnes).

- A total of 673 facilities in Canada and the United States reported releases of carbon monoxide above the higher US NEI threshold. These facilities reported 3.4 million tonnes of air releases of carbon monoxide for 2002. The 143 matched Canadian NPRI facilities reported almost 836,200 tonnes, and the 530 matched US NEI facilities 2.5 million tonnes.
- In NPRI, primary metals facilities, mainly aluminum smelters, reported 51 percent of the total, the lumber and wood products sector reported 14 percent, and the paper products sector reported 12 percent.
- In the US NEI, primary metals facilities also represented the largest air releases of carbon monoxide with 38 percent, followed by electric utilities with 16 percent, and chemical manufacturers with 14 percent.
- Air releases of carbon monoxide from industrial sources were concentrated in Quebec, Texas and Indiana. These three states/province accounted for over one-quarter of air releases of carbon monoxide from industrial facilities located in Canada and the United States with releases over the US NEI threshold in 2002.

3.2.2 Nitrogen Oxides (NO_x)

Nitrogen oxides (NO_x) are a group of gases, consisting of nitrogen dioxide (NO_2) and nitric oxide (NO). Nitrogen dioxide is a reddish brown gas with a pungent and irritating odor (OMOE 2004). It can change in the atmosphere to form nitric acid and nitrates, which can contribute to increased levels of the smallest particulates ($PM_{2.5}$). NO_2 is also one of the building blocks of ozone, a major component of smog. Ozone is created when its building blocks, nitrogen oxides and volatile organic compounds interact in the atmosphere in the presence of sunlight. Ground-level ozone behaves differently than the ozone layer high above the earth that screens out the sun's harmful ultraviolet rays.

Main Sources

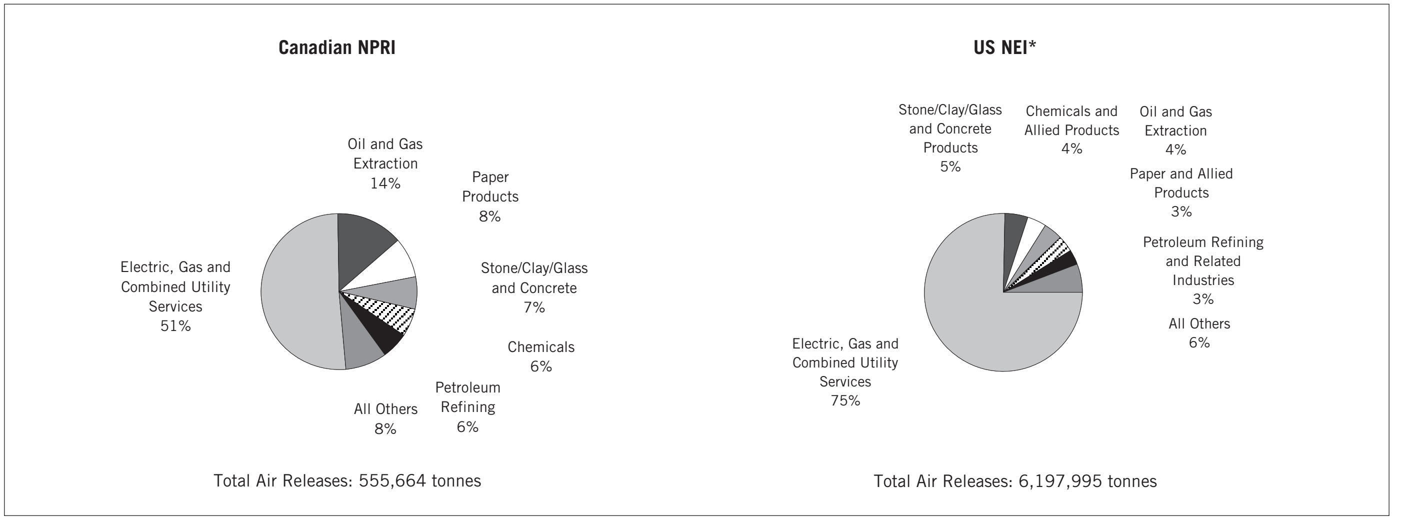
Nitrogen oxides are created during combustion. Transportation, utilities, incineration and primary metals production are large sources of NO_x (OMOE 2004). NO_x can also be created naturally, through lightning and from bacterial decomposition in soil. These natural sources of NO_x are called biogenic sources. With regard to ozone pollution episodes, biogenic sources of NO_x are relatively insignificant compared to NO_x emissions from human activity.

In the United States, industrial sources, including fuel combustion, accounted for 43 percent of nitrogen oxides air emissions in 2002. Transportation vehicles accounted for 54 percent. In Canada, industrial sources and fuel combustion accounted for 39 percent of nitrogen oxides air emissions in 2000 while transportation vehicles accounted for 60 percent. In the Mexico City inventory for 2002, 84 percent of nitrogen oxides emissions came from mobile sources (see **Figure 3–1**, above).

Health and Environmental Effects

Nitrogen oxides can irritate the lungs, cause bronchitis and pneumonia and increase susceptibility to respiratory infection (OMOE 2004, EPA 2004a). Nitrogen oxides can change into nitric acid, which can acidify lakes, rivers, streams and soils.

Figure 3–3. Air Releases, Canadian NPRI and US NEI, by Industry, 2002: Nitrogen Oxides



Note: Facilities with air releases equal to or greater than US NEI threshold of 100 tons (90.7 tonnes).
* Preliminary draft data from US National Emissions Inventory as of February 2005.

Table 3–6. US and Canadian Industrial Facilities with Largest Air Releases of Criteria Air Contaminants, 2002: Nitrogen Oxides

			SIC Codes		Nitrogen Oxides	
Rank	Facility	City, State/Province	Canada	US	Number of Facilities	Tonnes
1	TVA Cumberland Fossil Plant	Cumberland, TN		491/493	1	45,300
2	TVA	Drakesboro, KY		491/493	1	42,655
3	DP&L, J.M. Stuart Generating Station	Aberdeen, OH		491/493	1	42,421
4	Duke Energy Corp - Belews Creek Steam Station	Walnut Cove, NC		491/493	1	40,709
5	Gavin Power Plant	Cheshire, OH		491/493	1	39,763
6	Appalachian Power - John E Amos Plant	St. Albans, WV		491/493	1	39,456
7	Ontario Power Generation Inc, Nanticoke Generating Station	Nanticoke, ON	49	491/493	1	38,204
8	Detroit Edison/Monroe Power	Monroe, MI		491/493	1	37,755
9	Four Corners Power Plant	Fruitland, NM		491/493	1	37,711
10	Mount Storm Power Plant	Mount Storm, WV		491/493	1	36,169
11	W.H. Sammis Plant	Stratton, OH		491/493	1	35,033
12	Kansas City Power & Light Co.	Lacygne, KS		491/493	1	34,847
13	PSI Energy - Gibson	Princeton, IN		491/493	1	34,686
14	New Madrid Power Plant	New Madrid County, MO		491/493	1	33,982
15	Georgia Power Company, Bowen Steam-Electric Generating Plant	Cartersville, GA		491/493	1	33,833
	Subtotal				**15**	**572,523**
	% of Total				**0.3**	**8**
	Total				**4,484**	**6,753,659**

Note: Data for 2002 from Canadian NPRI and US NEI (preliminary draft data from US National Emissions Inventory as of February 2005). The data are estimates of releases of chemicals as reported by facilities and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.

Nitric acid can damage trees and crops. Atmospheric nitrogen deposition from NO_x and other nitrogen-containing compounds contributes to eutrophication of waterways and coastal estuaries. This results from an increase in nutrient deposition to a water body, producing algae blooms, which can reduce or eliminate the oxygen available to aquatic plants and animals. Nitric acid can also damage metals and destroy rubber and other materials. Nitrogen oxides are therefore of concern because of their role in producing ozone, acid rain, eutrophication, and particulate matter.

The Canadian government considers the precursors of ozone, namely nitrogen oxides and volatile organic compounds (VOCs) toxic under the Canadian Environmental Protection Act. Ozone is a colorless gas and is a major component of smog. Ozone is not directly emitted into the atmosphere, but is formed in the atmosphere. Ozone levels can vary over the day, week and month and from year to year. Like many air pollutants, ozone does not respect boundaries and can travel over large regions spanning international borders.

Ozone can cause serious health effects; even low levels of ozone can cause inflammation of the lungs and airways. Asthma attacks increase, chest tightness increases and lung functioning decreases with rising ozone levels. Visits to the emergency room for asthma and acute admissions for respiratory illness tend to increase when ozone levels rise. People with respiratory illness, asthma and heart problems are at a higher risk as the ozone levels increase (OMOE, 2004). Children and people who exercise or work outside are also sensitive to increases in ozone levels (OMOE 2001). Recent evaluations have found that there is no "safe" level for ozone or any "threshold" for it (OMOE 2001, MIT 2000). Ozone can also damage agricultural crops, forests, garden plants and trees.

2002 Data on Air Releases from Industrial Sources, Canada and the United States

The threshold for reporting nitrogen oxides to NPRI is 20 metric tonnes, and for reporting to the US NEI is 100 tons (90.7 metric tonnes).

- A total of 4,484 facilities in Canada and the United States reported above the higher US NEI threshold. These facilities reported a total of 6.8 million tonnes of nitrogen oxides released to air for 2002. The 532 matched Canadian NPRI facilities reported almost 555,700 tonnes, and the 3,952 matched US NEI facilities had 6.2 million tonnes.
- In NPRI for 2002, electric and gas utilities, reported 51 percent of the total, the oil and gas extraction industry reported 14 percent and the paper products sector reported 8 percent.
- In the US NEI, electric and gas utilities also represented the largest air releases of nitrogen oxides, with 75 percent, followed by stone/clay/glass and concrete manufacturers with 5 percent and chemical manufacturers with 4 percent.
- The largest air releases from industrial sources of nitrogen oxides were found in Texas, Ohio, Indiana, Florida and Pennsylvania. These five states accounted for over one-quarter of air releases of nitrogen oxides from industrial facilities in Canada and the United States with releases over the US NEI threshold in 2002.
- The 15 facilities with the largest air releases of nitrogen oxides in 2002 accounted for 8 percent of the total. The top 15 facilities were all electric utilities, with 14 located in the United States and one in Canada. The two facilities with the largest releases were owned by the Tennessee Valley Authority (TVA).

Map 3–2. Largest Industrial Sources of Air Releases, Canada and US, 2002: Nitrogen Oxides

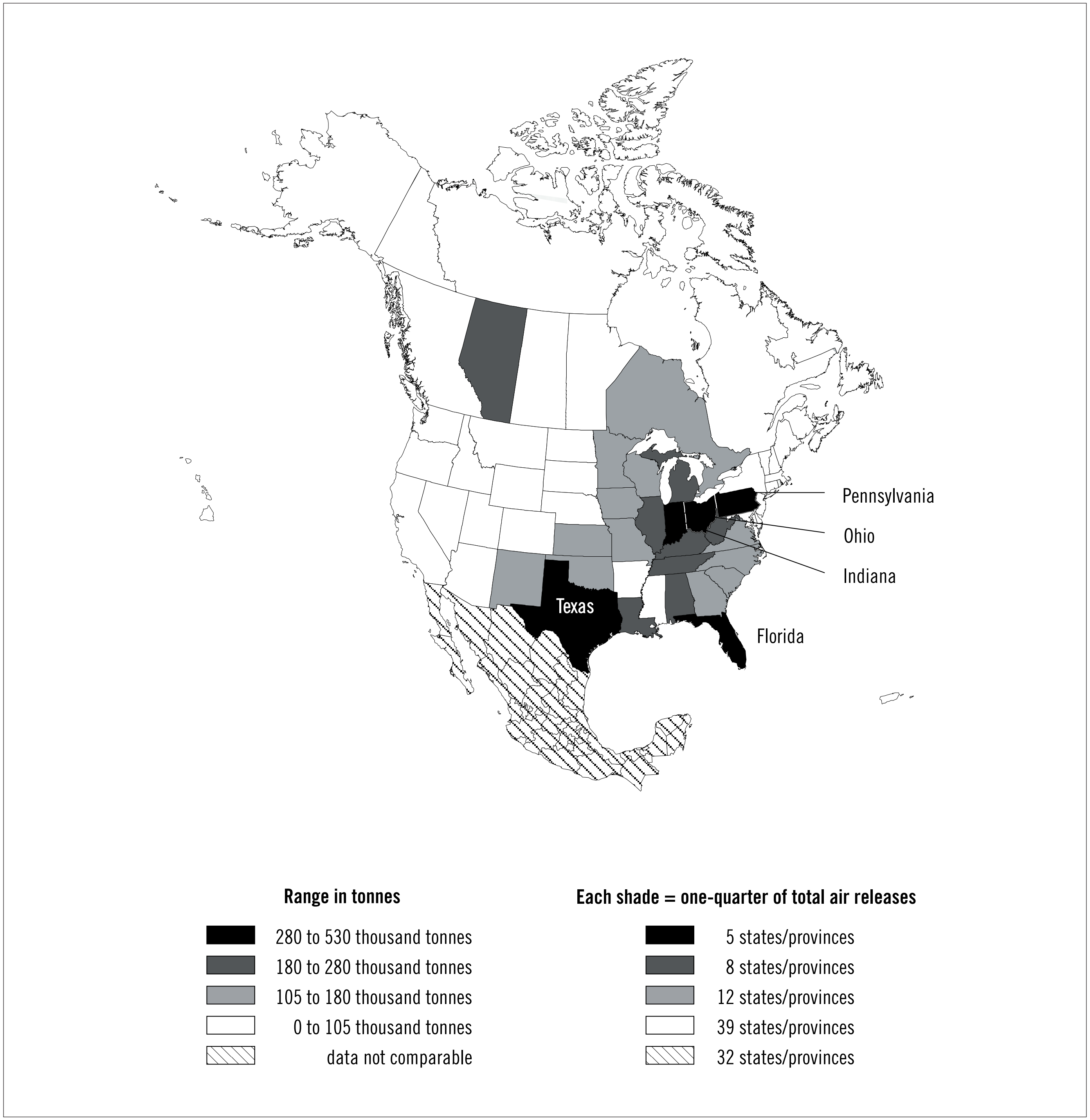


Table 3–7. North American Air Releases of Criteria Air Contaminants, by Industry, 2002: Nitrogen Oxides

		Canadian NPRI Nitrogen Oxides		Mexican COA Nitrogen Oxides		US NEI* Nitrogen Oxides		North America Nitrogen Oxides	
US SIC Code	Industry	Number of Facilities	Tonnes	Number of Facilities	Tonnes	Number of Facilities	Tonnes	Number of Facilities	Tonnes
491/493	Electric, Gas and Combined Utility Services	159	284,426	48	2,031,809	1,682	4,661,289	1,889	6,977,524
13	Oil and Gas Extraction	103	76,424	32	511,583	551	232,179	686	820,187
32	Stone/Clay/Glass and Concrete Products	33	38,084	39	204,719	300	298,760	372	541,562
33	Primary Metal Industries	16	14,657	22	265,348	143	87,116	181	367,120
28	Chemicals and Allied Products	35	31,510	22	16,894	298	245,289	355	293,693
29	Petroleum Refining and related Industries	19	31,451	21	76,462	133	174,991	173	282,904
26	Paper and Allied Products	82	45,883	13	7,465	191	216,153	286	269,501
37	Transportation Equipment	2	409	10	234,897	32	7,159	44	242,465
7389/4953	Hazardous Waste Management	1	415	2	6,402	85	40,741	88	47,558
	Total	**450**	**523,259**	**209**	**3,355,579**	**3,415**	**5,963,676**	**4,074**	**9,842,515**

* Preliminary draft data from US National Emissions Inventory as of February 2005.

2002 Data on Air Releases from Industrial Sources, Canada, Mexico and the United States

Selection of the Canadian NPRI, Mexican COA and the US NEI data for just those industry sectors required to report to the Mexican COA and those reporting above the US NEI threshold results in data from 4,074 facilities and 9.8 million tonnes of air releases of nitrogen oxides from these facilities in North America.

- US facilities accounted for 61 percent, Mexican facilities for 34 percent and Canadian facilities for 5 percent of the total air releases of nitrogen oxides from this matched set of facilities.
- In all three countries, electric utilities reported the largest amounts of nitrogen oxides in 2002.
- In Canada, electric utilities accounted for 54 percent of nitrogen oxide air emissions, followed by oil and gas extraction facilities with 15 percent.
- In Mexico, electric utilities accounted for 61 percent, followed by oil and gas extraction facilities with 15 percent.
- In the United States, electric utilities accounted for 78 percent of nitrogen oxide air emissions, followed by stone/clay/glass and concrete manufacturers with 5 percent.

3.2.3 Particulates

We define as particulate matter all airborne solid and liquid particles, except pure water, that are microscopic in size. Particulates can contain many different types of chemicals, such as sulfates, nitrates, ammonia, trace metals and carbon compounds.

Particulates can be emitted directly into the atmosphere, earning the name primary particulates, or they can be formed in the atmosphere through chemical and physical reactions, and are thus known as secondary particulates. Often the gases sulfur dioxide, nitrogen oxides and volatile organic compounds and ammonia create secondary particulates.

Main Sources

Particulate matter ranges considerably in size. What is reported as total particulate matter, or total suspended particulates, includes particles that measure less than 100 micrometers. Coarse particulates larger than about 50 micrometers tend to settle out of the air. Particulates larger than about 10 micrometers are usually due to "fugitive dust" (sand and dirt blown by winds from roads, fields and construction sites) and contain large amounts of silica materials. Smaller particles less than 10 micrometers in diameter are considered inhalable particulates and are designated as PM_{10}. The smallest dust particles comprise much of PM_{10}, but a significant contribution is created during various combustion processes and includes fly ash from power plants, carbon black from automobile and diesel engines, and soot from fireplaces and wood stoves (UDEQ 2001).

In the United States in 2002, industrial sources, including fuel combustion, accounted for 9 percent of PM_{10} emissions and mobile sources (both on- and off-road vehicles) 2 percent, while the vast majority of PM_{10} emissions (86 percent) came from other sources such as unpaved roads and agricultural areas. In Canada, industrial sources accounted for 5 percent and transportation vehicles accounted for 2 percent of PM_{10} emissions in 2000. Open sources, such as open burning, unpaved roads or construction sites and agricultural areas, accounted for 90 percent. In the Mexico City inventory for 2002, 72 percent came from point and area sources (including industrial sources) and 19 percent came from mobile sources (see **Figure 3–1**).

Another fraction of even smaller particulates, those particles less than 2.5 micrometers in size, is designated as $PM_{2.5}$. $PM_{2.5}$ is most commonly created by chemical reactions in the atmosphere between the gases that can result from fuel combustion in motor vehicles, at power plants, and in other industrial processes (EPA 2005). It is a major contributor to visibility-related problems in both urban and rural areas, such as the brownish haze over cities. $PM_{2.5}$ can remain suspended in the air for long periods of time, and so travel far from its source.

Health and Environmental Effects

In general, the size of particulate matter is inversely proportional to its effect on human health because the smaller the particle, the more likely it is to be carried deep into the lungs. Because of this ability to travel deep into the lungs, scientists are especially concerned about the effects of the smallest particulates ($PM_{2.5}$).

Numerous studies have linked particulate matter to cardiac and respiratory problems such as asthma, bronchitis and emphysema. Children, the elderly and people with existing respiratory conditions are especially sensitive to health effect from particulates (OMOE 2004). Many scientists believe there is no threshold or safe level for exposure to particulate matter.

Particulates can also reduce visibility by scattering and absorbing light. This reduced visibility or regional haze is becoming a significant problem in many areas in North America. Much of the haze is due to secondary particulate matter, which is formed when gases, especially sulfur oxides, convert into particulate matter in the atmosphere. The United States has recently developed regulations to combat regional haze.

Particulate matter less than 10 microns (both PM_{10} and $PM_{2.5}$) has been declared toxic under the Canadian Environmental Protection Act. This designation sets in motion a formal process to develop plans to control and reduce particulates.

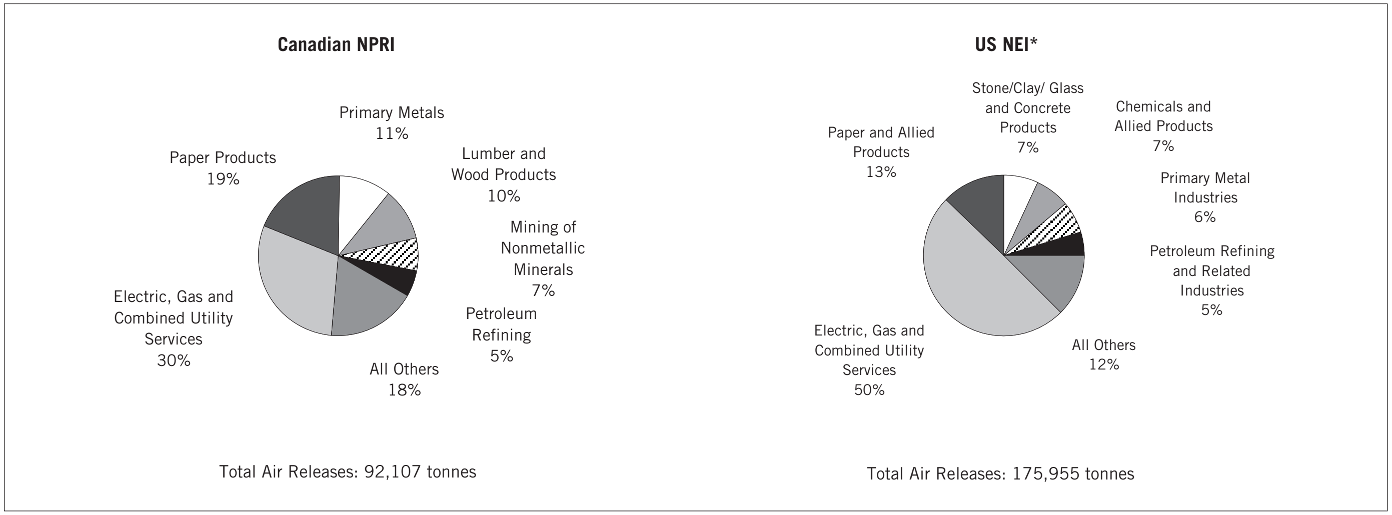
2002 Data on Air Releases from Industrial Sources, Canada and the United States

Particulates less than 10 microns

The threshold for reporting particulates less than 10 microns in diameter to NPRI is 0.5 metric tonnes and for reporting to the US NEI is 100 tons (90.7 metric tonnes).

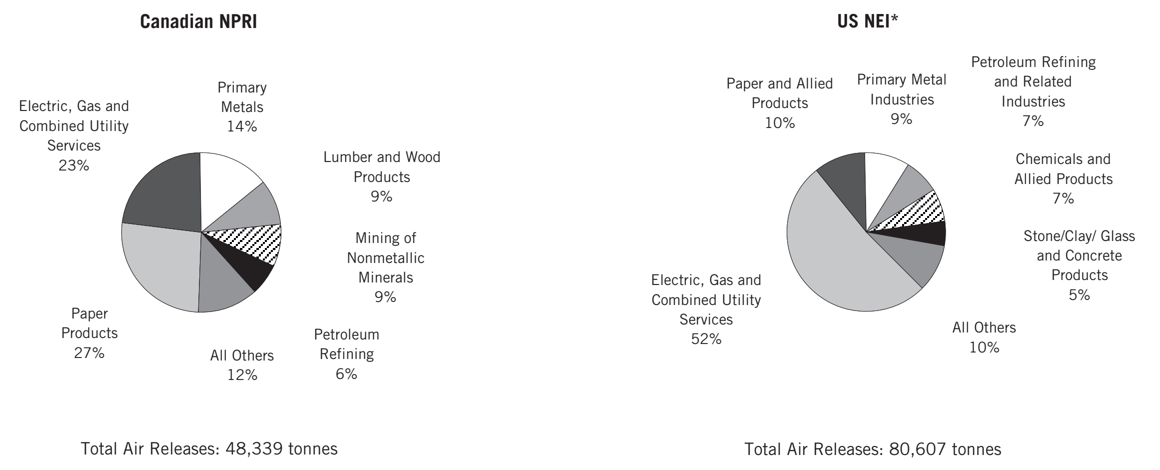
- A total of 629 facilities in Canada and the United States reported above the US NEI threshold. These facilities reported almost 268,100 tonnes of air releases of particulates less than 10 microns in diameter for 2002. The 194 matched Canadian NPRI facilities reported over 92,100 tonnes, and the 435 matched US NEI facilities had almost 176,000 tonnes.

Figure 3–4. Air Releases, Canadian NPRI and US NEI, by Industry, 2002: Particulates less than 10 microns



Note: Facilities with air releases equal to or greater than US NEI threshold of 100 tons (90.7 tonnes).
* Preliminary draft data from US National Emissions Inventory as of February 2005.

Figure 3–5. Air Releases, Canadian NPRI and US NEI, by Industry, 2002: Particulates less than 2.5 microns



Note: Facilities with air releases equal to or greater than US NEI threshold of 100 tons (90.7 tonnes).
* Preliminary draft data from US National Emissions Inventory as of February 2005.

However, these contributions are dwarfed by those of other sources, such as unpaved roads, agricultural areas and open burning, which accounted for 17.4 million tonnes in the United States in 2002 and 4.6 million tonnes in Canada in 2000.

- In NPRI for 2002, electric and gas utilities reported 30 percent of the total, the paper products sector reported 19 percent, and primary metals facilities reported 11 percent.
- In the US NEI, electric and gas utilities also represented the largest air releases of particulates less than 10 microns in diameter with 50 percent, followed by paper products facilities with 13 percent, and stone/clay/glass and concrete manufacturers with 7 percent.

Particulates less than 2.5 microns

The threshold for reporting particulates less than 2.5 microns in diameter to NPRI is 0.3 metric tonnes and for reporting to the US NEI is 100 tons (90.7 metric tonnes).

- A total of 384 facilities reported above the US NEI threshold to NPRI and the US NEI. These facilities reported 128,946 tonnes of air releases of $PM_{2.5}$ for 2002. The 139 matched Canadian NPRI facilities reported over 48,300 tonnes, and the 245 matched US NEI facilities had over 80,600 tonnes.
- In NPRI for 2002, the paper products sector reported 27 percent of the total, electric and gas utilities reported 23 percent, and primary metals facilities reported 14 percent.
- In the US NEI, electric and gas utilities represented the largest air releases of $PM_{2.5}$ with 52 percent, followed by paper products facilities with 10 percent, and primary metals facilities with 9 percent.

3.2.4 Sulfur Dioxide (SO_2)

Sulfur dioxide (SO_2) is a colorless, pungent gas.

Main Sources

Sulfur dioxide is emitted primarily from fuel combustion, followed by industrial process such as smelters, steel mills, refineries and pulp and paper mills, and then transportation (EPA 2004b).

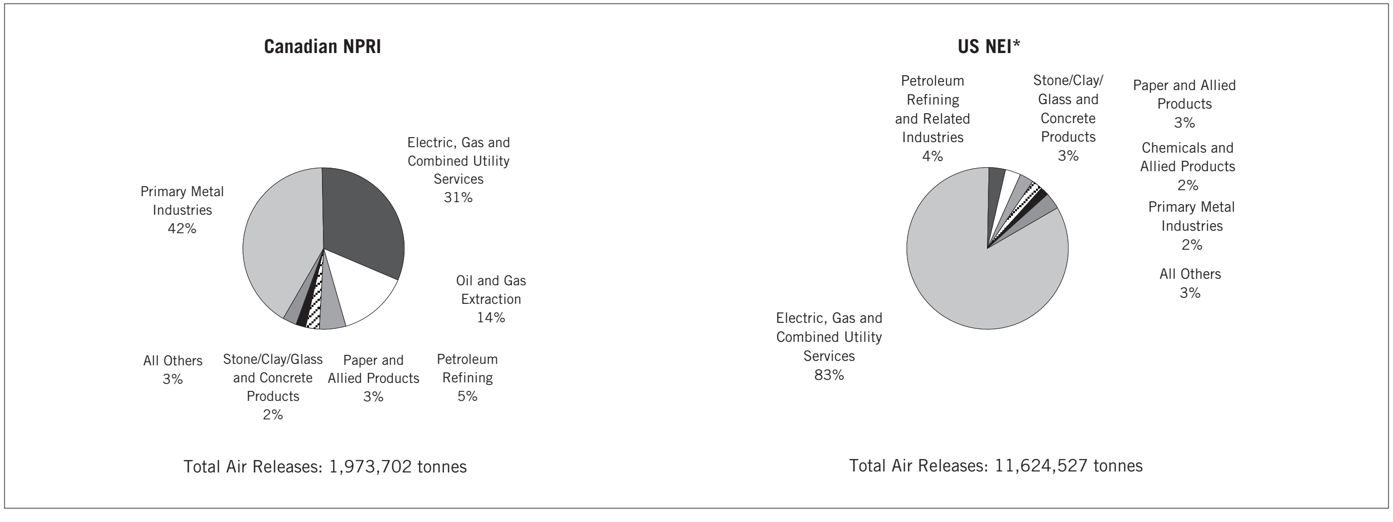
In the United States, industrial sources, including fuel combustion, accounted for 95 percent of sulfur dioxide air emissions in 2002. In Canada, industrial sources accounted for 68 percent and non-industrial fuel combustion for 29 percent of sulfur dioxide emissions in 2000. In the Mexico City inventory for 2002, 42 percent came from point sources (including industrial sources) and 58 percent came from mobile sources (see **Figure 3–1** above).

Health and Environmental Effects

When high levels of SO_2 are inhaled, breathing problems, respiratory illness, changes in lung tissue and increased respiratory and cardiovascular diseases can occur (OMOE 2004). People with asthma, chronic lung and heart disease may be especially sensitive to this gas. SO_2 emissions react with other chemicals in the atmosphere to form sulfate particles, an important contributor to the fine particle mix that circulates in the air we breathe. Fine particles have been linked to a number of serious human health problems, particularly among children, the elderly, and individuals with pre-existing cardiovascular or lung diseases (e.g., asthma). These health effects include premature death, increased respiratory symptoms and disease, decreased lung function, and alterations in lung tissue and structure and in respiratory tract defense mechanisms.

SO_2 emissions are also a major contributor to acid deposition, commonly known as "acid rain," which can result in harm to fish and other aquatic life, forests, crops, buildings, and monuments. Fine particles formed from SO_2 emissions also are significant contributors to poor visibility at scenic panoramas across North America because the particles efficiently scatter natural light, thus creating hazy views (EPA 2004b).

Figure 3–6. Air Releases, Canadian NPRI and US NEI, by Industry, 2002: Sulfur Dioxide



Note: Facilities with air releases equal to or greater than US NEI threshold of 100 tons (90.7 tonnes).
* Preliminary draft data from US National Emissions Inventory as of February 2005.

Table 3–8. US and Canadian Industrial Facilities with Largest Air Releases of Criteria Air Contaminants, 2002: Sulfur Dioxide

			SIC Codes		Sulfur Dioxide	
Rank	Facility	City, State/Province	Canada	US	Number of Facilities	Tonnes
1	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	29	33	1	235,907
2	Inco Limited, Thompson Operations	Thompson, MB	29	33	1	196,419
3	Hudson Bay Mining and Smelting Company Ltd., Metallurgical Complex, Anglo American PLC	Flin Flon, MB	29	33	1	177,887
4	Georgia Power Company, Bowen Steam-Electric Generating Plant	Cartersville, GA		491/493	1	145,735
5	Allegheny Energy Supply Co/Hatfields Ferry Power Station	Masontown, PA		491/493	1	143,957
6	Reliant Energy Keystone Power Plant	Shelocta, PA		491/493	1	136,616
7	W. H. Sammis Plant	Stratton, OH		491/493	1	131,622
8	Conesville Power Plant	Conesville, OH		491/493	1	122,926
9	Alabama Power Company	Wilsonville, AL		491/493	1	115,857
10	PSI Energy - Gibson	Princeton, IN		491/493	1	115,516
11	DP&L, J.M. Stuart Generating Station	Aberdeen, OH		491/493	1	106,620
12	Muskingum River Power Plant	Waterford, OH		491/493	1	104,785
13	PPL Montour LLC/Montour	Washingtonville, PA		491/493	1	101,084
14	TVA Johnsonville Fossil Plant	New Johnsonville, TN		491/493	1	98,678
15	Appalachian Power - John E Amos Plant	St. Albans, WV		491/493	1	97,614
	Subtotal				**15**	**2,031,224**
	% of Total				**1**	**15**
	Total				**2,348**	**13,461,593**

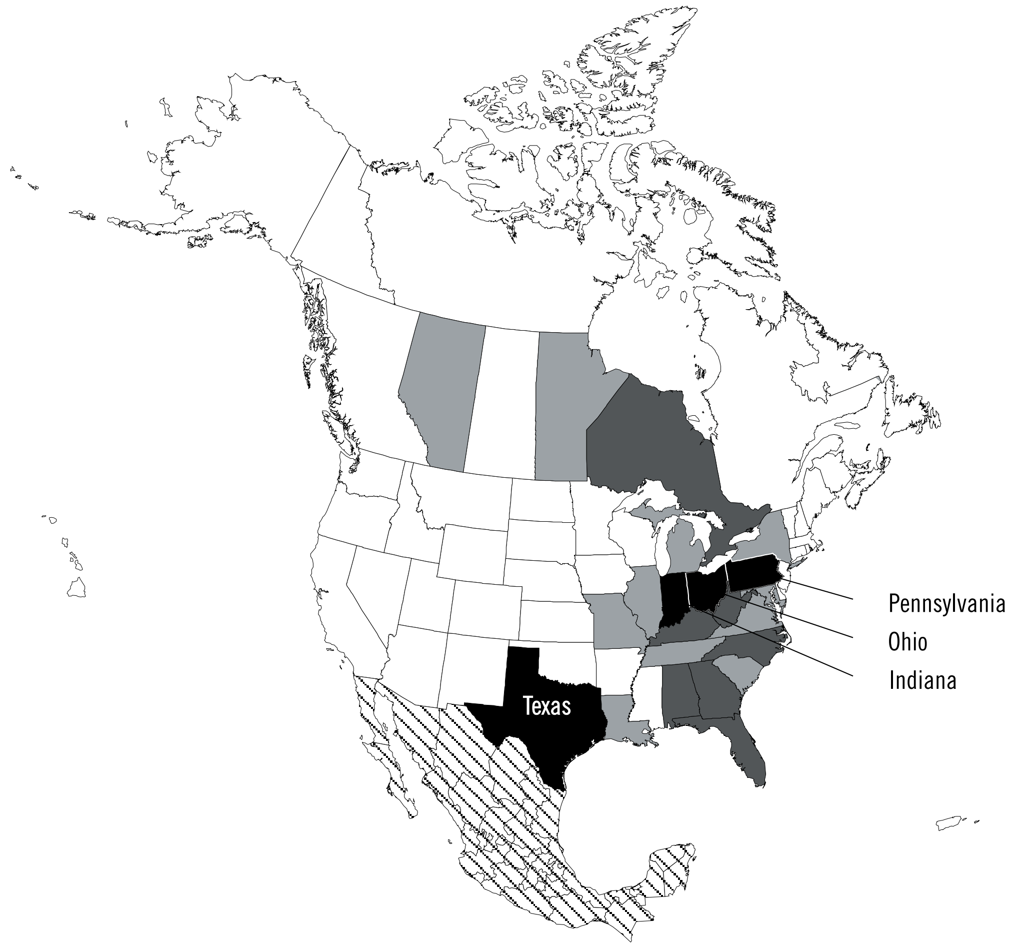
Note: Data for 2002 from Canadian NPRI and US NEI (preliminary draft data from US National Emissions Inventory as of February 2005). The data are estimates of releases of chemicals as reported by facilities and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.

Data on Air Releases from Industrial Sources, Canada and the United States

The threshold for reporting sulfur dioxide to NPRI is 20 metric tonnes and for reporting to the US NEI is 100 tons (90.7 metric tonnes).

- A total of 2,348 facilities reported above the US NEI threshold to NPRI and the US NEI. These facilities reported 13.6 million tonnes of air releases of sulfur dioxide for 2002. The 334 matched Canadian NPRI facilities reported 2.0 million tonnes, and the 2,014 matched US NEI facilities had 11.5 million tonnes.
- In NPRI for 2002, the primary metals industry reported 42 percent of the total air releases of sulfur dioxide, electric and gas utilities reported 31 percent, and the oil and gas extraction industry reported 14 percent.
- In the US NEI, electric and gas utilities represented the largest air releases of sulfur dioxide, with 83 percent of the total. Petroleum refiners followed with 4 percent and stone/clay/glass and concrete product manufacturers reported 3 percent.
- The largest air releases of sulfur dioxide were found in Ohio, Pennsylvania, Indiana, and Texas. These four states accounted for over one-quarter of air releases of sulfur dioxide from industrial facilities in Canada and the United States with releases over the US NEI threshold in 2002.
- The 15 facilities with the largest air releases of sulfur dioxide in 2002 accounted for 15 percent of the total. The top three facilities were primary metals facilities located in Canada; the other 12 were electric utilities located in the United States.

Map 3–3. Largest Industrial Sources of Air Releases, Canada and US, 2002: Sulfur Dioxide



Range in tonnes	**Each shade = one-quarter of total air releases**
600 to 1,200 thousand tonnes	4 states/provinces
425 to 600 thousand tonnes	7 states/provinces
230 to 425 thousand tonnes	11 states/provinces
0 to 230 thousand tonnes	42 states/provinces
data not comparable	32 states/provinces

Table 3–9. North American Air Releases of Criteria Air Contaminants, by Industry, 2002: Sulfur Dioxide

		Canadian NPRI Sulfur Dioxide		Mexican COA Sulfur Dioxide		US NEI* Sulfur Dioxide		North America Sulfur Dioxide	
US SIC Code	Industry	Number of Facilities	Tonnes	Number of Facilities	Tonnes	Number of Facilities	Tonnes	Number of Facilities	Tonnes
491/493	Electric, Gas and Combined Utility Services	37	620,588	30	1,278,407	608	9,567,921	675	11,466,916
33	Primary Metal Industries	33	818,682	14	88,061	97	254,114	144	1,160,857
29	Petroleum Refining and related Industries	21	105,525	9	272,280	132	337,029	162	714,834
32	Stone/Clay/Glass and Concrete Products	26	37,090	27	403,569	288	209,872	341	650,530
28	Chemicals and Allied Products	17	19,410	31	53,741	190	413,990	238	487,141
26	Paper and Allied Products	72	55,230	12	13,725	196	333,237	280	402,192
13	Oil and Gas Extraction	73	281,281	10	15,604	102	88,352	185	385,237
37	Transportation Equipment	3	902	3	520	17	7,896	23	9,318
7389/4953	Hazardous Waste Management	1	281	0	0	26	6,946	27	7,227
	Total	**283**	**1,938,990**	**136**	**2,125,906**	**1,656**	**11,219,357**	**2,075**	**15,284,252**

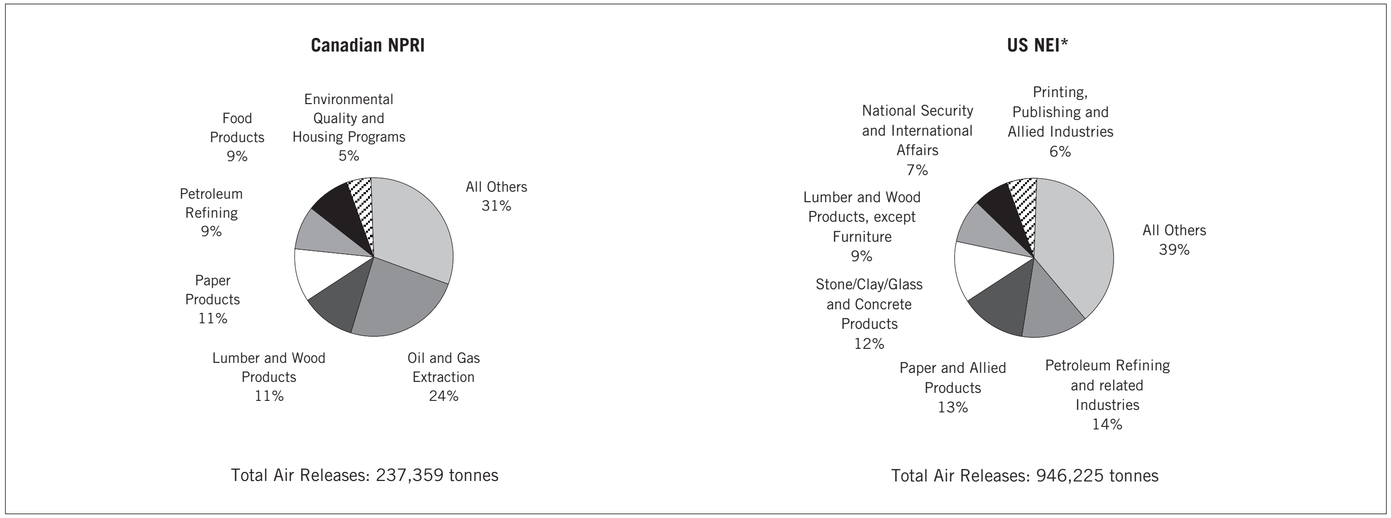
* Preliminary draft data from US National Emissions Inventory as of February 2005.

2002 Data on Air Releases from Industrial Sources, Mexico, Canada and the United States

Selection of the Canadian NPRI, Mexican COA and the US NEI data for just those industry sectors required to report to the Mexican COA and those reporting above the US NEI threshold results in data from 2,075 facilities and 15.3 million tonnes of air releases of sulfur dioxide from these facilities in North America.

- US facilities accounted for 73 percent, Mexican facilities for 14 percent and Canadian facilities for 13 percent of the total air releases of sulfur dioxide from this matched set of facilities.
- In both the United States and Mexico, electric utilities reported the largest amounts in 2002. For Canada, the primary metals sector had the largest air releases of sulfur dioxide in 2002.
- In Canada, the primary metals sector accounted for 42 percent of sulfur dioxide air emissions, followed by electric utilities with 32 percent.
- In Mexico, electric utilities accounted for 60 percent, followed by stone/clay/glass and concrete manufacturers with 19 percent.
- In the United States, electric utilities accounted for 85 percent of sulfur dioxide air releases, followed by chemical manufacturers with 4 percent.

Figure 3–7. Air Releases, Canadian NPRI and US NEI, by Industry, 2002: Volatile Organic Compounds



Note: Facilities with air releases equal to or greater than US NEI threshold of 100 tons (90.7 tonnes).
* Preliminary draft data from US National Emissions Inventory as of February 2005.

3.2.5 Volatile Organic Compounds (VOCs)

Volatile organic compounds are a large category of chemicals that share one characteristic, they evaporate or volatilize into the air. VOCs are one of the building blocks of ozone, a major component of smog. VOCs can also form particulates in the atmosphere. Different compounds included within the VOC category differ in their reactivity and their ability to create ozone.

Main Sources

VOCs come from a wide range of sources, including vehicles, fossil fuel combustion, chemical and steel manufacturing, painting and stripping activities, petroleum refining and solvent use. Other significant sources of VOCs include vegetation and forest fires (OMOE 2004; Environment Canada 2003).

In the United States, industrial sources, including fuel combustion, accounted for 49 percent of air emissions of volatile organic compounds in 2002, while 44 percent came from vehicles (both on- and off-road). In Canada, industrial sources and fuel combustion accounted for 42 percent and transportation vehicles accounted for 26 percent of air emissions of volatile organic compounds in 2000. Open sources, such as open burning, unpaved roads or construction sites, accounted for 12 percent. In the Mexico City inventory for 2002, 59 percent came from point and area sources (including industrial sources) and 38 percent came from mobile sources (see **Figure 3–1** above).

Health and Environmental Effects

VOCs are a group of chemicals with varying environmental and health effects. Some VOCs like benzene are known carcinogens; others such as toluene are suspected developmental toxics. Some VOCs (butadiene, acrolein, acryonitrile and 1,3-butadiene) have recently been declared toxic under the Canadian Environmental Protection Act.

Historically, there have been different definitions of VOCs and, consequently, different lists of chemicals considered as VOCs. Currently, the definition of VOCs in Canada and Mexico is similar to EPA's regulatory definition of VOCs, found in the Code of Federal Regulations, Title 40: Protection of the Environment, Part 51-Requirement for Preparation, Adoption and Submittal of Implementation Plans, Subpart F: Procedural requirements, Subsection 51.100 Definitions (40 CFR 51.100), revised on 1 July 2004 (see <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=40&PART=51&SECTION=100&TYPE=TEXT>). Most countries also have a list of chemicals not considered VOCs and these are similar in all three countries.

For the definition of VOCs under NPRI reporting see "Supplementary Guide for Reporting Criteria Air Contaminants (CACs) to the National Pollutant Release Inventory, 2002," Appendix 3 (found at <http://www.ec.gc.ca/pdb/npri/2002guidance/CACs_2002_English.pdf>).

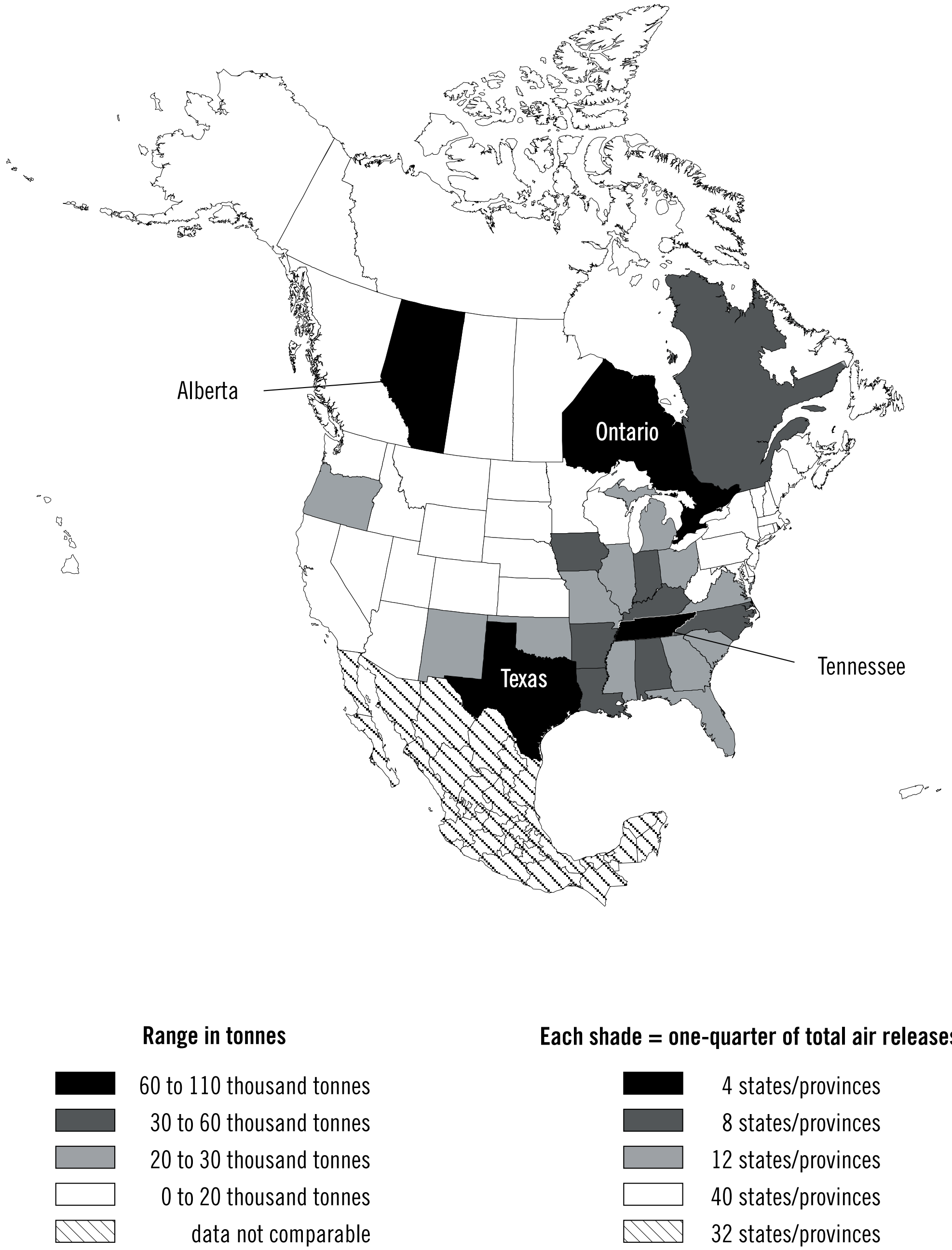
The Mexican regulation, NOM-075-ECOL-1995, establishing the maximum permissible emissions of VOCs, can be found at <http://www.economia.gob.mx/work/normas/1995/075-ecol-doc>.

2002 Data on Air Releases from Industrial Sources, Canada and the United States

VOCs are required to be reported as a group to NPRI at a threshold of 10 tonnes released to the air. The US NEI threshold is 90.7 tonnes (100 tons). In addition, multimedia reporting of for VOCs listed individually, such as benzene, is found on each of the countries' PRTRs. This section analyzes the group of VOCs; other chapters in this report analyze some of the VOCs, such as benzene, that are reported individually.

- A total of 3,152 facilities in Canada and the United States reported above the US NEI threshold. These facilities reported 1.2 million tonnes of air releases of volatile organic compounds for 2002. The 489 matched Canadian NPRI facilities reported almost 237,400 tonnes, and the 2,663 matched US NEI facilities had 946,200 tonnes. However, other sources such as transportation vehicles and smaller industrial sources—for example, processes using solvents to coat and maintain surfaces—commonly release much larger amounts in total.

Map 3–4. Largest Industrial Sources of Air Releases, Canada and US, 2002: Volatile Organic Compounds



- In the NPRI data in the matched data set for 2002, the oil and gas extraction industry reported 24 percent of the total while the lumber and wood products and paper products sectors each accounted for 11 percent.
- In the US NEI, petroleum refiners represented the largest air releases of volatile organic compounds, with 14 percent of the total. Paper products facilities followed with 13 percent, and stone/clay/glass and concrete products manufacturers accounted for 12 percent.
- The largest air releases of volatile organic compounds from industrial sources were found in Texas, Ontario, Alberta and Tennessee. These two states and two provinces accounted for over one-quarter of air releases of volatile organic compounds from industrial facilities in Canada and the United States with releases over the US NEI threshold in 2002.

2002 Data on Air Releases from Industrial Sources, Mexico, Canada and the United States

Selection of the Canadian NPRI, Mexican COA and the US NEI data for just those industry sectors required to report to the Mexican COA and those reporting above the US NEI threshold results in data from 1,687 facilities and 743 thousand tonnes of air releases of volatile organic compounds from these facilities in North America.

- US facilities accounted for 76 percent, Canadian facilities for 18 percent and Mexican facilities for 6 percent of the total air releases of volatile organic compounds from this matched set of facilities.
- The industry sectors reporting the largest amounts in the three countries differed.
- In Canada, the oil and gas extraction sector accounted for 43 percent of volatile organic compounds air emissions, followed by the paper products industry with 19 percent.
- In Mexico, chemical manufacturers accounted for 30 percent, followed by facilities making transportation equipment with 22 percent and the oil and gas extraction sector with 17 percent.
- In the United States, chemical manufacturers accounted for 23 percent of volatile organic compound air releases, followed by the paper products industry with 22 percent and petroleum refiners with 21 percent.

Table 3–10. North American Air Releases of Criteria Air Contaminants, by Industry, 2002: Volatile Organic Compounds

		Canadian NPRI VOCs		Mexican COA VOCs		US NEI* VOCs		North America VOCs	
US SIC Code	Industry	Number of Facilities	Tonnes	Number of Facilities	Tonnes	Number of Facilities	Tonnes	Number of Facilities	Tonnes
28	Chemicals and Allied Products	29	10,988	17	14,008	294	128,047	340	153,043
26	Paper and Allied Products	79	25,359	1	568	221	126,596	301	152,523
29	Petroleum Refining and related Industries	24	21,214	7	7,633	134	118,204	165	147,050
13	Oil and Gas Extraction	67	57,078	18	8,168	180	44,303	265	109,550
37	Transportation Equipment	22	11,414	10	10,460	153	58,656	185	80,530
33	Primary Metal Industries	17	2,835	1	138	138	43,526	156	46,498
491/493	Electric, Gas and Combined Utility Services	4	798	0	0	193	30,606	197	31,404
32	Stone/Clay/Glass and Concrete Products	3	903	3	6,405	51	11,432	57	18,740
7389/4953	Hazardous Waste Management	5	829	0	0	16	3,180	21	4,009
	Total	**250**	**131,417**	**57**	**47,380**	**1,380**	**564,549**	**1,687**	**743,346**

* Preliminary draft data from US National Emissions Inventory as of February 2005.

3.3 References

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4

Total Reported Amounts of Releases and Transfers, 2002

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Key Findings

- In 2002, total reported releases and transfers in North America were 3.25 billion kg for the matched data set of industries and chemicals.
- Releases represented 47 percent of all reported releases and transfers. On-site releases were 39 percent, and off-site releases were 8 percent.
- Off-site transfers to recycling were 33 percent of total reported releases and transfers in North America, and other off-site transfers for further management were 20 percent.
- TRI accounted for 91 percent of the facilities and for 89 percent of the total reported releases and transfers in North America, and NPRI accounted for 9 percent of facilities and 11 percent of total reported releases and transfers.
- The pattern of releases and transfers differed between NPRI and TRI. On-site air releases represented a larger share of NPRI releases and transfers (26 percent) than those of TRI (23 percent). Off-site transfers to recycling were also a larger share in NPRI than in TRI (50 percent versus 31 percent). However, on-site land was a greater share in TRI (11 percent versus 5 percent). Other off-site transfers for further management (to energy recovery primarily and also to sewage) made up a greater share of the total releases and transfers in TRI than in NPRI (21 percent versus 9 percent).
- The areas with the largest releases and transfers in 2002 were Texas, Ontario, Ohio and Michigan. Together, these four jurisdictions accounted for more than one-quarter (27 percent) of total reported releases and transfers in North America in 2002.
- Two manufacturing industries, primary metals and chemicals manufacturing, reported more than 600 million kg in total releases and transfers, with primary metals representing 24 percent and chemicals manufacturing 20 percent of the North American total reported in 2002. The chemicals with the largest totals reported by primary metals facilities were zinc and copper and their compounds, primarily as transfers to recycling and transfers to disposal. The electric utilities and hazardous waste management/solvent recovery sectors had the third- and fourth-largest totals.
- The average total releases and transfers per facility was 20 percent higher in NPRI than in TRI. The ratio of NPRI to TRI average kilograms per facility was 1.2 for total releases and transfers. This was mainly due to higher NPRI average off-site transfers to recycling and off-site transfers to disposal of substances other than metals (the ratio for both types was 1.9). Average on-site air releases were higher for NPRI (ratio of 1.4). Average releases to surface waters, underground injection and on-site land were smaller. Average kilograms per facility of other transfers for further management were also smaller in NPRI than in TRI.
- A small number of facilities accounted for a large percentage of total releases and transfers. Fifty North American facilities, all but four of them located in the US, accounted for 21 percent of total reported releases and transfers. Eighteen of the 50 facilities with the largest releases and transfers were primary metals facilities, 11 were hazardous waste management facilities, and 11 were chemical manufacturers.

4.1 Introduction

Chapter 4 examines total reported amounts of releases and transfers in North America for 2002. As explained in **Chapter 2**, this chapter analyzes data for industries and chemicals that must be reported in both the United States and Canada (the matched data set). Comparable Mexican data are not available for the 2002 reporting year.

Releases include on-site releases to air, water, land, and underground injection wells, as well as off-site releases (off-site transfers to disposal and all transfers of metals except those sent for recycling). In **Chapter 5**, releases are adjusted to account for off-site releases that are reported as on-site releases by other NPRI or TRI facilities. This chapter, however, analyzes all reported releases because it focuses on how facilities manage the total amounts they report.

Transfers include off-site transfers to recycling and other off-site transfers of substances (other than metals and their compounds) to energy recovery, treatment, and sewage.

Total reported amounts are the closest estimate we have of total amounts of chemicals arising from facilities' activities that require handling or management. Questions such as what kinds and types of waste are being sent off-site, what portion of materials are being recycled or transferred for disposal, or what portion of chemicals are being released on-site can be answered when all types of releases and transfers are considered.

4.2 Total Reported Amounts of Releases and Transfers, 2002

Total reported releases and transfers consist of on-site releases to air, surface water, underground injection, and land occurring at the reporting facility; off-site releases (transfers to disposal); transfers to recycling; and other types of transfers for further management (transfers to energy recovery, treatment, and sewage).

- In 2002, reported releases and transfers in North America totaled 3.25 billion kg for the matched data set of industries and chemicals.
- On- and off-site releases represented 47 percent of all reported releases and transfers in North America. On-site releases alone accounted for 39 percent of total reported amounts of releases and transfers.
- TRI accounted for 91 percent of the facilities and for 89 percent of the total reported releases and transfers in North America, and NPRI accounted for 9 percent of facilities and 11 percent of total reported releases and transfers.
- The pattern of releases and transfers in NPRI differed somewhat from that in TRI. On-site air releases represented a larger share of NPRI releases and transfers (26 percent) than those of TRI (23 percent). The proportion of off-site transfers to recycling was also larger in NPRI than in TRI (50 percent versus 31 percent). However, on-site land disposal was a greater share in TRI (11 percent versus 5 percent) and other off-site transfers for further management (to energy recovery primarily but also to sewage) made up a greater share of the total releases and transfers in TRI (21 percent) than in NPRI (9 percent).

Table 4–1. Summary of Total Reported Amounts of Releases and Transfers in North America, NPRI and TRI, 2002

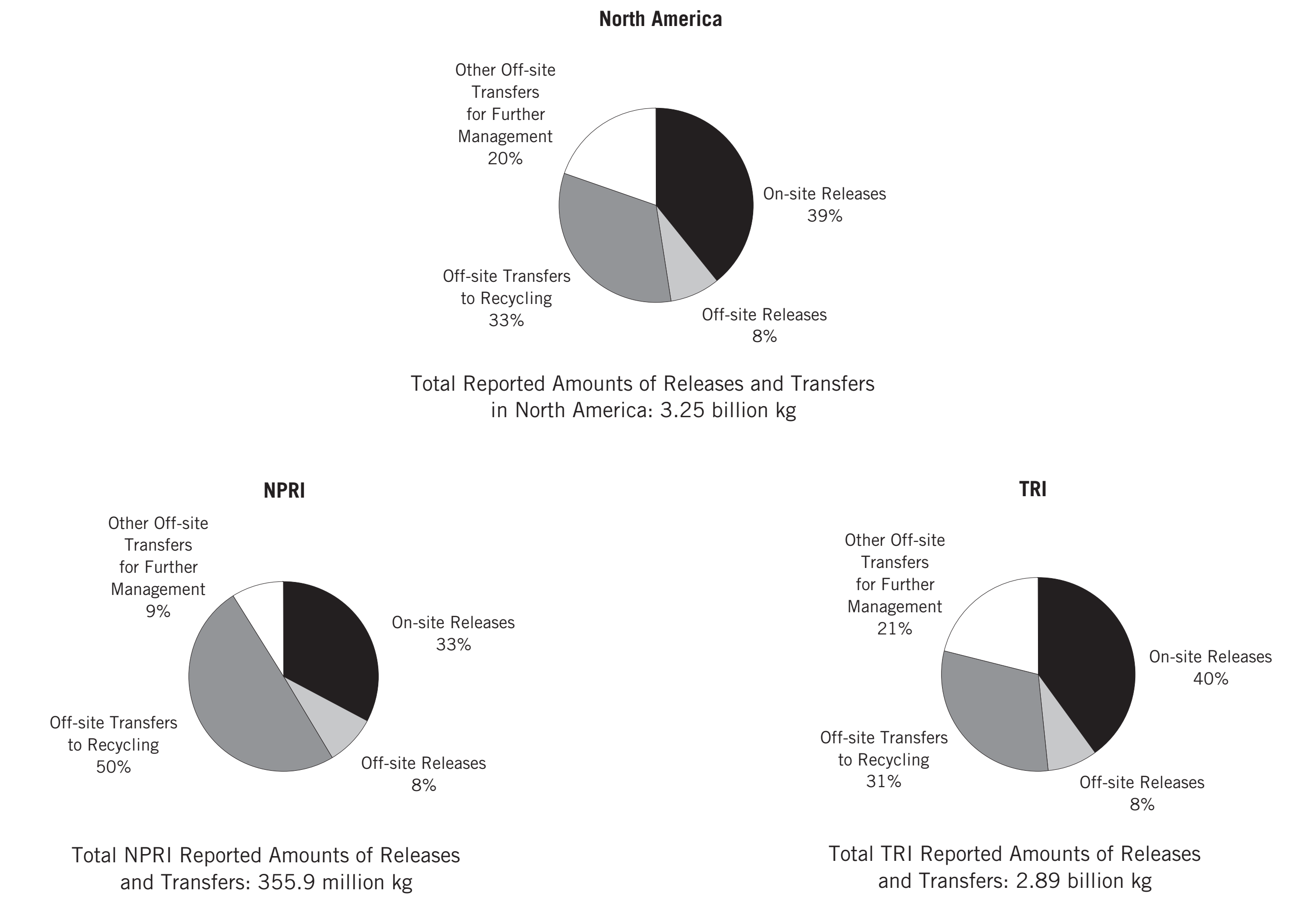
	North America		NPRI*		TRI		NPRI as % of North	TRI as % of North
	Number		Number		Number		American Total	American Total
Total Facilities	24,192		2,257		21,935		9	91
Total Forms	84,654		8,243		76,411		10	90
Releases On- and Off-site	**kg**	**%**	**kg**	**%**	**kg**	**%**		
On-site Releases	**1,273,863,312**	**39**	**116,679,060**	**33**	**1,157,184,252**	**40**	**9**	**91**
Air	752,310,204	23	92,691,779	26	659,618,425	23	12	88
Surface Water	106,556,614	3	6,301,432	2	100,255,181	3	6	94
Underground Injection	80,719,282	2	1,127,288	0,3	79,591,993	3	1	99
Land	334,153,615	10	16,434,963	5	317,718,652	11	5	95
Off-site Releases	**269,421,125**	**8**	**30,299,918**	**8**	**239,121,207**	**8**	**11**	**89**
Transfers to Disposal (except metals)	24,716,457	1	4,026,907	1	20,689,550	1	16	84
Transfers of Metals**	244,704,667	7	26,273,011	7	218,431,656	7	11	89
Total Reported Releases On- and Off-site	**1,543,284,437**	**47**	**146,978,978**	**41**	**1,396,305,459**	**48**	**10**	**90**
Off-site Transfers to Recycling	**1,065,424,087**	**33**	**177,156,915**	**50**	**888,267,172**	**31**	**17**	**83**
Transfers to Recycling of Metals	922,803,969	28	161,696,034	45	761,107,935	26	18	82
Transfers to Recycling (except metals)	142,620,118	4	15,460,881	4	127,159,237	4	11	89
Other Off-site Transfers for Further Management	**641,474,948**	**20**	**31,747,577**	**9**	**609,727,371**	**21**	**5**	**95**
Energy Recovery (except metals)	357,874,239	11	8,310,365	2	349,563,874	12	2	98
Treatment (except metals)	127,737,805	4	15,143,184	4	112,594,621	4	12	88
Sewage (except metals)	155,862,903	5	8,294,028	2	147,568,875	5	5	95
Total Reported Amounts of Releases and Transfers	**3,250,183,472**	**100**	**355,883,470**	**100**	**2,894,300,002**	**100**	**11**	**89**

Note: Canada and US data only. Mexico data not available for 2002. Data include 203 chemicals common to both NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data, in combination with other information, can be used as a starting point in evaluating exposures that may result from releases and other management activities which involve these chemicals.

* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

** Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

Figure 4–1. Percentage of Total Reported Amounts of Releases and Transfers in North America by Type, NPRI and TRI, 2002



Note: Canada and US data only. Mexico data not available for 2002.

- Because of the large size of the TRI data set, North American percentages were close to or the same as TRI percentages—40 percent for on-site releases, 8 percent for off-site releases, 31 percent for off-site transfers to recycling, and 21 percent for other off-site transfers for further management.

Query Builder

http://www.cec.org/takingstock/

To find out more details on the types of releases and transfers for NPRI and TRI using *Taking Stock Online*:

1. select **Country** report.
2. select the **year 2002**.
3. select **Canada & USA** for the geographic area, select **All chemicals** for the chemical, select **All industries** for the industrial sector.
4. check all boxes (or specific types of releases and/or transfers).

Then click on ✓ **Run the query**

4.2.1 Total Reported Amounts of Releases and Transfers by State and Province, 2002

In 2002, three states and one province each reported more than 190 million kg. Together, these four jurisdictions reported more than one-quarter (27 percent) of total reported releases and transfers in North America.

- Texas facilities reported the largest total releases and transfers: 254.1 million kg, over 8 percent of all releases and transfers reported in North America in 2002. Texas ranked second for total on-site releases and third for total releases; the state also ranked second for the category "other transfers for further management" (which excludes recycling), with such transfers being more than one-third of its total reported releases and transfers (90.5 million kg or 36 percent).
- Ontario facilities had the second-largest releases and transfers, 211.6 million kg or 7 percent of the total. Ontario ranked first in transfers to recycling and fifth for total releases on- and off-site.
- Ohio facilities reported the third-largest releases and transfers, 209.7 million kg. Ohio ranked second in total releases and third in transfers to recycling.
- Facilities in Michigan had the fourth-largest releases and transfers, 197.5 million kg. Michigan ranked first in other transfers for further waste management.
- The total for the top 10 jurisdictions accounted for half of all releases and transfers in 2002. In addition to the four top ranked, they included Indiana, Pennsylvania, Arizona, Illinois, North Carolina, and Tennessee.
- Three jurisdictions reported less than 70,000 kg in 2002: Guam, the District of Columbia and the Northern Marianas.

Table 4–2. Total Reported Amounts of Releases and Transfers in North America, by State and Province, 2002

		Releases On- and Off-site				Off-site Transfers for Further Management									
State/Province	Number of Facilities	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site kg	Rank	Total Transfers to Recycling kg	Rank	Total Other Transfers for Further Management* kg	Rank	Total Reported Amounts of Releases and Transfers kg	Rank	2002 Population**	Land Area (sq km)	2002 Gross Domestic Product*** US$ millions	Rank
Alabama	503	44,720,055	8,559,507	53,279,562	12	19,598,185	19	12,270,113	18	85,147,860	12	4,478,896	131,432	125,567	27
Alaska	16	117,786	407	118,193	62	152,420	56	3,448	60	274,061	62	641,482	1,477,155	29,708	51
Alberta	187	11,980,065	3,160,946	15,141,011	31	5,643,119	37	3,373,325	33	24,157,455	36	3,114,400	661,194	95,519	32
Arizona	232	129,355,899	212,597	129,568,495	1	7,746,969	34	1,376,302	40	138,691,767	7	5,441,125	294,310	171,781	23
Arkansas	340	11,117,235	4,122,306	15,239,541	30	30,092,177	11	21,049,494	7	66,381,213	18	2,706,268	134,864	71,929	38
British Columbia	140	12,122,771	2,562,468	14,685,240	32	25,006,636	15	463,853	45	40,155,728	28	4,115,000	947,806	86,320	35
California	1,370	14,534,047	3,676,362	18,210,409	26	26,591,568	13	20,018,369	9	64,820,346	19	35,001,986	403,939	1,367,785	1
Colorado	194	4,023,221	525,937	4,549,158	46	15,052,031	24	6,590,156	29	26,191,345	34	4,501,051	268,637	179,410	22
Connecticut	327	1,900,711	3,525,389	5,426,099	41	11,405,517	27	6,971,315	26	23,802,932	37	3,458,587	12,548	165,744	24
Delaware	67	3,246,666	1,839,603	5,086,269	42	4,153,338	39	1,696,928	37	10,936,535	43	805,945	5,063	47,150	44
District of Columbia	5	27,301	135	27,435	64	7,689	61	0	--	35,125	64	569,157	158	66,440	40
Florida	636	55,404,908	1,142,634	56,547,543	7	8,490,556	33	3,531,463	32	68,569,561	16	16,691,701	139,841	520,500	4
Georgia	678	50,492,616	1,691,078	52,183,694	13	19,021,226	20	8,962,108	20	80,167,028	14	8,544,005	149,999	305,829	10
Guam	5	70,593	396	70,990	63	0	--	4	62	70,993	63	161,057	550	--	--
Hawaii	26	1,055,131	21,517	1,076,648	56	2,407	62	859	61	1,079,914	58	1,240,663	16,634	43,998	47
Idaho	82	17,667,098	165,049	17,832,147	27	1,191,843	47	385,635	47	19,409,625	41	1,343,124	214,309	38,558	49
Illinois	1,182	41,594,436	14,235,992	55,830,427	8	45,954,040	6	22,099,510	6	123,883,977	8	12,586,447	143,975	486,139	5
Indiana	986	56,135,698	39,899,063	96,034,761	4	71,197,699	2	14,631,352	15	181,863,811	5	6,156,913	92,896	204,946	16
Iowa	396	10,307,449	5,467,661	15,775,110	29	18,995,095	21	5,691,125	31	40,461,330	27	2,935,840	144,705	98,232	31
Kansas	273	6,559,396	3,894,223	10,453,618	34	15,456,308	23	24,774,526	5	50,684,452	25	2,711,769	211,905	89,508	34
Kentucky	461	34,492,796	3,217,926	37,710,723	16	22,055,201	17	16,555,142	14	76,321,066	15	4,089,822	102,898	122,282	29
Louisiana	350	43,179,127	2,455,999	45,635,125	14	17,905,789	22	17,995,376	11	81,536,290	13	4,476,192	112,827	131,584	26
Maine	91	3,477,130	424,884	3,902,014	50	1,693,270	45	455,562	46	6,050,846	48	1,294,894	79,934	39,039	48
Manitoba	71	3,450,892	1,349,315	4,800,207	44	915,520	49	732,622	42	6,448,349	47	1,155,500	649,953	23,609	54
Maryland	174	18,032,827	843,921	18,876,748	24	2,081,089	42	2,701,744	36	23,659,581	38	5,450,525	25,315	201,879	17
Massachusetts	524	2,414,904	1,024,525	3,439,429	51	10,423,698	29	7,775,950	21	21,639,077	39	6,421,800	20,299	288,088	13
Michigan	872	27,275,179	26,985,796	54,260,975	9	43,987,079	7	99,219,860	1	197,467,914	4	10,043,221	147,124	351,287	9
Minnesota	449	6,777,302	2,366,553	9,143,854	36	11,889,140	26	7,107,267	25	28,140,261	32	5,024,791	206,192	200,061	18
Mississippi	309	23,876,112	517,823	24,393,935	21	9,254,684	31	2,793,044	35	36,441,663	29	2,866,733	121,498	69,136	39
Missouri	543	25,603,462	3,199,563	28,803,026	19	21,263,158	18	10,698,033	19	60,764,218	21	5,669,544	178,432	187,543	21
Montana	33	2,954,698	68,343	3,023,041	52	54,569	58	37,525	56	3,115,135	55	910,372	376,961	23,773	53
Nebraska	166	9,958,597	8,967,737	18,926,334	23	8,995,706	32	1,429,178	39	29,351,217	30	1,727,564	199,099	60,962	41
Nevada	65	3,132,799	880,842	4,013,641	48	593,199	54	66,398	55	4,673,238	52	2,167,455	284,376	81,182	36
New Brunswick	32	5,747,597	1,039,944	6,787,541	39	605,872	52	24,724	58	7,418,137	44	750,200	73,440	13,477	60
New Hampshire	131	1,853,209	90,012	1,943,221	55	4,285,191	38	491,435	44	6,719,847	46	1,274,405	23,228	46,448	45
New Jersey	517	7,888,612	1,801,695	9,690,307	35	10,858,094	28	39,875,475	3	60,423,876	22	8,575,252	19,214	380,169	8
New Mexico	67	1,383,807	570,918	1,954,725	54	1,810,461	44	167,498	53	3,932,685	54	1,852,044	314,311	53,515	43
New York	691	15,912,708	1,642,584	17,555,291	28	41,835,089	9	7,204,536	23	66,594,917	17	19,134,293	122,301	792,058	2
Newfoundland and Labrador	6	831,760	47,020	878,780	57	0	--	0	--	878,780	59	519,300	405,721	10,542	61
North Carolina	803	49,067,725	4,293,714	53,361,439	11	42,521,009	8	6,876,687	27	102,759,135	9	8,305,820	126,170	300,216	12
North Dakota	41	3,123,749	869,445	3,993,194	49	660,747	50	229,044	51	4,882,985	50	633,911	178,681	19,780	57
Northern Marianas	3	2,527	0	2,527	65	0	--	0	--	2,527	65	74,003	477	--	--
Nova Scotia	42	5,238,245	256,613	5,494,858	40	1,420,677	46	202,460	52	7,117,995	45	934,400	55,491	17,259	59
Ohio	1,542	82,877,107	22,468,175	105,345,282	2	67,865,566	3	36,524,005	4	209,734,853	3	11,408,699	106,060	388,224	7
Oklahoma	303	7,113,841	1,410,644	8,524,485	37	9,944,027	30	1,676,917	38	20,145,429	40	3,489,700	177,865	95,126	33
Ontario	1,256	58,123,712	13,515,692	71,639,404	5	120,600,170	1	19,392,632	10	211,632,206	2	12,096,600	1,068,586	304,462	11
Oregon	264	9,623,828	3,694,806	13,318,634	33	5,866,122	36	6,876,395	28	26,061,151	35	3,520,355	248,629	115,138	30
Pennsylvania	1,312	46,664,687	24,952,668	71,617,355	6	65,837,570	4	14,324,984	16	151,779,909	6	12,328,827	116,075	428,950	6
Prince Edward Island	5	227,176	38,613	265,788	60	10,514	60	297,267	50	573,569	60	137,000	5,659	2,387	62
Puerto Rico	133	4,462,271	248,075	4,710,346	45	6,403,159	35	17,643,721	12	28,757,226	31	3,859,000	8,950	57,800	42
Quebec	480	17,462,054	4,914,461	22,376,515	22	22,354,739	16	7,176,238	24	51,907,491	24	7,443,500	1,540,689	156,372	25
Rhode Island	127	281,725	108,105	389,829	58	3,532,406	41	906,331	41	4,828,566	51	1,068,326	2,706	36,988	50
Saskatchewan	38	1,494,790	3,414,845	4,909,635	43	599,668	53	84,456	54	5,593,759	49	995,500	652,334	22,028	55
South Carolina	511	25,340,293	9,416,420	34,756,714	17	29,841,235	12	20,726,025	8	85,323,974	11	4,103,770	77,981	122,354	28
South Dakota	81	2,150,947	15,110	2,166,057	53	249,021	55	367,369	48	2,782,447	56	760,437	196,555	25,003	52
Tennessee	611	50,114,052	3,327,321	53,441,373	10	39,869,973	10	5,883,703	30	99,195,049	10	5,789,796	106,752	190,122	20
Texas	1,354	90,932,859	7,448,982	98,381,841	3	65,282,050	5	90,451,718	2	254,115,609	1	21,736,925	678,305	773,455	3
Utah	168	22,497,038	3,508,161	26,005,199	20	1,035,923	48	632,608	43	27,673,730	33	2,318,789	212,799	72,974	37
Vermont	38	72,975	68,217	141,192	61	660,049	51	324,960	49	1,126,201	57	616,408	23,953	19,604	58
Virgin Islands	5	287,929	5,671	293,600	59	56,086	57	33,512	57	383,199	61	108,810	340	--	--
Virginia	451	27,011,464	3,870,941	30,882,406	18	12,694,704	25	13,680,773	17	57,257,882	23	7,287,829	102,551	287,589	14
Washington	311	6,435,851	808,625	7,244,476	38	4,091,016	40	3,167,726	34	14,503,219	42	6,067,060	172,431	232,940	15
West Virginia	206	36,380,134	1,772,655	38,152,789	15	1,915,561	43	7,562,658	22	47,631,008	26	1,804,884	62,381	45,518	46
Wisconsin	870	11,797,638	6,663,647	18,461,284	25	25,795,647	14	17,206,839	13	61,463,770	20	5,439,692	140,662	190,650	19
Wyoming	40	4,402,096	130,849	4,532,945	47	50,814	59	4,666	59	4,588,425	53	498,830	251,483	20,285	56
Total	**24,192**	**1,273,863,312**	**269,421,125**	**1,543,284,437**		**1,065,424,087**		**641,474,948**		**3,250,183,472**					

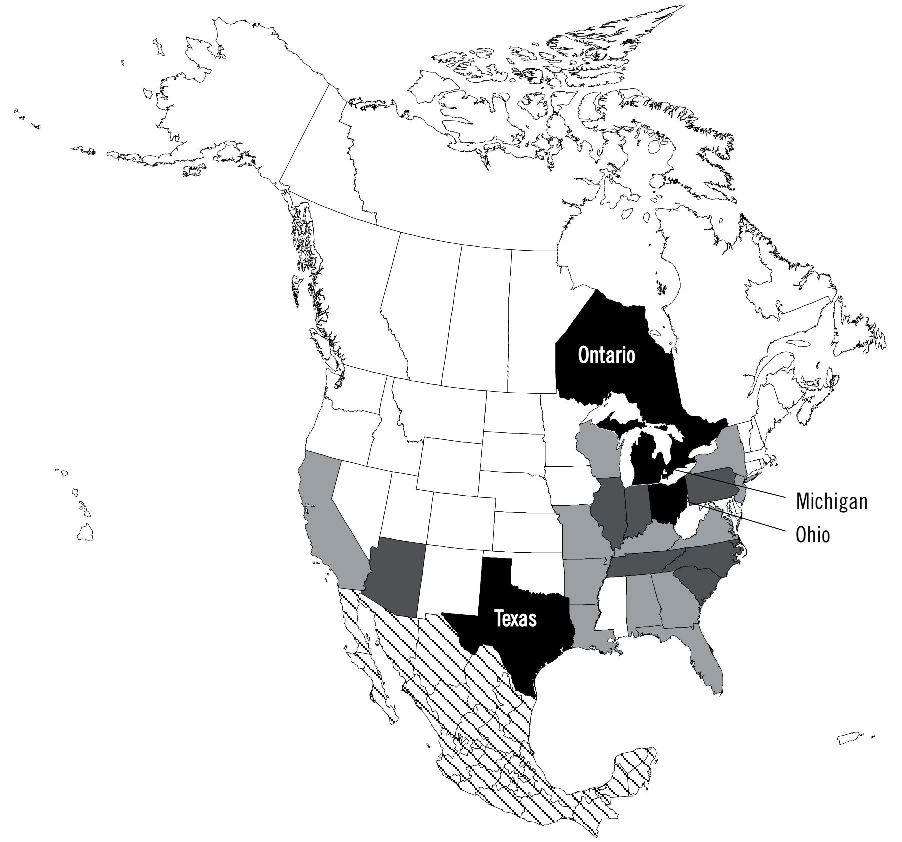
Note: Canada and US data only. Mexico data not available for 2002. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings are meant to imply that a facility, state or province is not meeting its legal requirements. The data do not predict levels of exposure of the public to those chemicals.

* Includes transfers to energy recovery, treatment and sewage, except for metals, which are included in off-site releases.

** Population data for Canada from <http://www.statcan.ca/english/Pgdb/demo02.htm> (accessed 23 September 2004) and for United States from <http://www.census.gov/popest/states/NST-ann-est.html> (accessed 23 September 2003). For Guam, the Northern Marianas, Puerto Rico and Virgin Islands from <http://www.census.gov/ipc/www/idbsum.html>.

*** Gross Domestic product for Canada from <http://www.statcan.ca/english/Pgdb/econ15.htm> (2002 data, accessed 23 September 2004) with exchange rate of US$0.6368 per C$ from <http://www.statcan.ca/english/Pgdb/econ07.htm> (2002 data, accessed 23 September 2004) and for United States from <http://www.bea.doc.gov/bea/regional/gsp.htm> (2002 data, accessed 20 December 2004).

Map 4–1. Largest Sources of Total Reported Amounts of Releases and Transfers in North America, 2002: States and Provinces



Range in kilograms

- 190 to 255 million kg
- 85.2 to 190 million kg
- 55 to 85.2 million kg
- 0 to 55 million kg
- no data

Each shade = one-quarter of total releases and transfers

- 4 states/provinces
- 7 states/provinces
- 12 states/provinces
- 42 states/provinces
- 32 states/provinces

4.2.2 Total Reported Amounts of Releases and Transfers by Industry Sector, 2002

Facilities in five manufacturing industries each reported more than 230 million kg in total releases and transfers in 2002.

- The primary metals industry reported the largest amount, 780.2 million kg, primarily as on- and off-site releases (reporting the largest off-site releases) and as transfers to recycling (reporting the largest transfers of metals to recycling). This industry reported more than 50 percent of its total as zinc and copper and their compounds, primarily as transfers to recycling and transfers of metals to disposal.
- The chemical manufacturing industry reported the second-largest total releases and transfers (639.2 million kg), primarily as other off-site transfers for further management (reporting the largest transfers to energy recovery, to treatment and to sewage) and as on-site releases (reporting the largest underground injection). Methanol, nitric acid and nitrate compounds, toluene, and xylenes were the chemicals reported by this industry in the largest amounts, primarily as off-site transfers for further management (both transfers to energy recovery and to sewage).
- The electric utility industry reported the third-largest amount, 423.7 million kg. This industry reported the largest amount of on-site releases (reporting the largest on-site air emissions) and total on- and off-site releases. More than 50 percent of the total reported releases and transfers by this industry were on-site air releases of hydrochloric acid.

Table 4–3. Total Reported Amounts of Releases and Transfers in North America by Industry, 2002

			Releases On- and Off-site			Off-site Transfers for Further Management				
Rank	US SIC Code	Industry	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site (kg)	Total Transfers to Recycling (kg)	Total Other Transfers for Further Management* (kg)	Total Reported Amounts of Releases and Transfers (kg)	NPRI as % of North American Total	TRI as % of North American Total
1	33	Primary Metals	225,683,311	160,480,427	386,163,737	383,392,169	10,671,476	780,227,382	10	90
2	28	Chemicals	197,184,982	23,361,158	220,546,139	75,106,688	343,522,915	639,175,742	5	95
3	491/493	Electric Utilities	403,525,341	14,651,570	418,176,912	5,454,011	34,469	423,665,391	6	94
4	495/738	Hazardous Waste Mgt./ Solvent Recovery	66,406,833	22,621,454	89,028,288	13,035,893	153,387,296	255,451,477	9	91
5	34	Fabricated Metals Products	15,966,411	10,737,973	26,704,384	195,957,429	14,545,254	237,207,066	24	76
6	36	Electronic/Electrical Equipment	5,934,567	2,825,615	8,760,182	133,073,090	12,051,868	153,885,141	3	97
7	--	Multiple codes 20–39**	34,222,296	8,379,410	42,601,706	64,613,647	24,440,021	131,655,375	--	100
8	37	Transportation Equipment	32,872,016	5,434,150	38,306,165	78,912,585	9,472,441	126,691,191	24	76
9	26	Paper Products	100,713,102	2,998,562	103,711,664	1,117,570	20,064,403	124,893,638	24	76
10	20	Food Products	57,459,919	2,337,133	59,797,052	636,103	17,386,948	77,820,103	6	94
11	30	Rubber and Plastics Products	36,213,494	4,568,100	40,781,594	6,626,313	8,044,202	55,452,109	19	81
12	35	Industrial Machinery	2,962,824	3,070,767	6,033,591	44,618,466	1,406,654	52,058,710	9	91
13	29	Petroleum and Coal Products	32,524,858	1,989,597	34,514,454	10,823,200	5,097,705	50,435,360	15	85
14	39	Misc. Manufacturing Industries	3,360,635	1,578,532	4,939,167	33,289,829	1,707,768	39,936,763	74	26
15	32	Stone/Clay/Glass Products	14,868,961	2,490,294	17,359,256	2,012,001	4,098,122	23,469,379	8	92
16	24	Lumber and Wood Products	18,469,729	572,008	19,041,737	376,749	1,739,065	21,157,551	29	71
17	27	Printing and Publishing	8,789,238	134,159	8,923,397	5,824,557	2,362,848	17,110,802	15	85
18	38	Measurement/Photographic Instruments	3,314,438	152,655	3,467,093	4,343,961	2,196,634	10,007,687	0	100
19	25	Furniture and Fixtures	4,379,380	49,377	4,428,757	2,111,109	1,222,184	7,762,051	36	64
20	5169	Chemical Wholesalers	448,848	94,302	543,150	34,827	6,180,818	6,758,795	1	99
21	5171	Petroleum Bulk Terminals	1,715,757	112,367	1,828,124	3,629,252	420,670	5,878,046	2	98
22	22	Textile Mill Products	2,820,829	244,137	3,064,966	352,678	1,178,330	4,595,973	9	91
23	12	Coal Mining	3,107,588	2,432	3,110,020	3,605	0	3,113,625	0	100
24	31	Leather Products	298,103	508,914	807,017	67,154	74,897	949,069	3	97
25	21	Tobacco Products	459,601	3,244	462,845	0	571	463,415	0	100
26	23	Apparel and Other Textile Products	160,253	22,787	183,040	11,202	167,390	361,631	0	100
		Total	**1,273,863,312**	**269,421,125**	**1,543,284,437**	**1,065,424,087**	**641,474,948**	**3,250,183,472**	**11**	**89**

Note: Canada and US data only. Mexico data not available for 2002.

* Includes transfers to energy recovery, treatment and sewage, except for metals, which are included in off-site releases.

** Multiple SIC codes reported only in TRI.

Table 4–3. (*continued*)

Rank	US SIC Code	Industry	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 50% of total reported amounts)
1	33	Primary Metals	Zinc and compounds (transfers to recycling, transfers of metals to disposal), Copper and compounds (transfers to recycling)
2	28	Chemicals	Methanol (transfers to energy recovery, sewage), Nitric acid and nitrate compounds (transfers to sewage), Toluene, Xylenes (transfers to energy recovery), Manganese and compounds (land, transfers of metals to disposal), Ethylene (air)
3	491/493	Electric Utilities	Hydrochloric acid (air)
4	495/738	Hazardous Waste Mgt./ Solvent Recovery	Xylenes, Toluene (transfers to energy recovery), Zinc and compounds (land), Methanol (transfers to energy recovery)
5	34	Fabricated Metals Products	Copper/Zinc and compounds (transfers to recycling)
6	36	Electronic/Electrical Equipment	Lead and compounds (transfers to recycling)
7	--	Multiple codes 20–39*	Copper and compounds (transfers to recycling), Nitric acid and nitrate compounds (water), Methanol (air), Zinc/Lead and compounds (transfers to recycling)
8	37	Transportation Equipment	Copper and compounds (transfers to recycling), Xylenes (air), Nickel/Chromium/Manganese and compounds (transfers to recycling)
9	26	Paper Products	Methanol (air)
10	20	Food Products	Nitric acid and nitrate compounds (water)
11	30	Rubber and Plastics Products	Styrene, Toluene, Methyl ethyl ketone (air), Zinc and compounds (transfers of metals to disposal)
12	35	Industrial Machinery	Copper/Chromium/Manganese and compounds (transfers to recycling)
13	29	Petroleum and Coal Products	Ethylene glycol (transfers to recycling), Nitric acid and nitrate compounds (water), Sulfuric acid, Toluene (air)
14	39	Misc. Manufacturing Industries	Lead and compounds (transfers to recycling)
15	32	Stone/Clay/Glass Products	Hydrochloric acid, Hydrogen fluoride (air), Lead and compounds (transfers of metals to disposal), Chromium and compounds (transfers to recycling), Toluene, Xylenes (transfers to energy recovery, air)
16	24	Lumber and Wood Products	Methanol, Formaldehyde (air)
17	27	Printing and Publishing	Toluene (air)
18	38	Measurement/Photographic Instruments	Copper and compounds (transfers to recycling), Methanol (air, transfers to energy recovery), Nitric acid and nitrate compounds (water), Dichloromethane (air), Chromium and compounds (transfers to recycling), Hydrochloric acid (air)
19	25	Furniture and Fixtures	Toluene, Xylenes (air)
20	5169	Chemical Wholesalers	Xylenes, Toluene (transfers to energy recovery)
21	5171	Petroleum Bulk Terminals	Toluene, Xylenes (transfers to recycling), Methyl tert-butyl ether (air)
22	22	Textile Mill Products	Methyl ethyl ketone, Toluene, Methanol (air)
23	12	Coal Mining	Manganese and compounds, Lead and compounds (land)
24	31	Leather Products	Chromium/Manganese and compounds (transfers of metals to disposal)
25	21	Tobacco Products	Hydrochloric acid (air)
26	23	Apparel and Other Textile Products	Methyl ethyl ketone (transfers to energy recovery), Toluene (air)

Note: Canada and US data only. Mexico data not available for 2002.
* Multiple SIC codes reported only in TRI.

- Hazardous waste management and solvent recovery facilities reported the fourth-largest amount, with 255.5 million kg, primarily other off-site transfers for further management (reporting the second-largest transfers to energy recovery and to treatment). Xylenes, toluene and methanol were among the chemicals reported in the largest amounts by this industry. They were primarily transferred for energy recovery.
- The fifth-ranked fabricated metals products sector reported 237.2 million kg, with over 50 percent of its total as copper and zinc and their compounds transferred to recycling.

Query Builder

http://www.cec.org/takingstock/

To find out what chemicals are releases and/or transfered by each industry sector using *Taking Stock Online*:

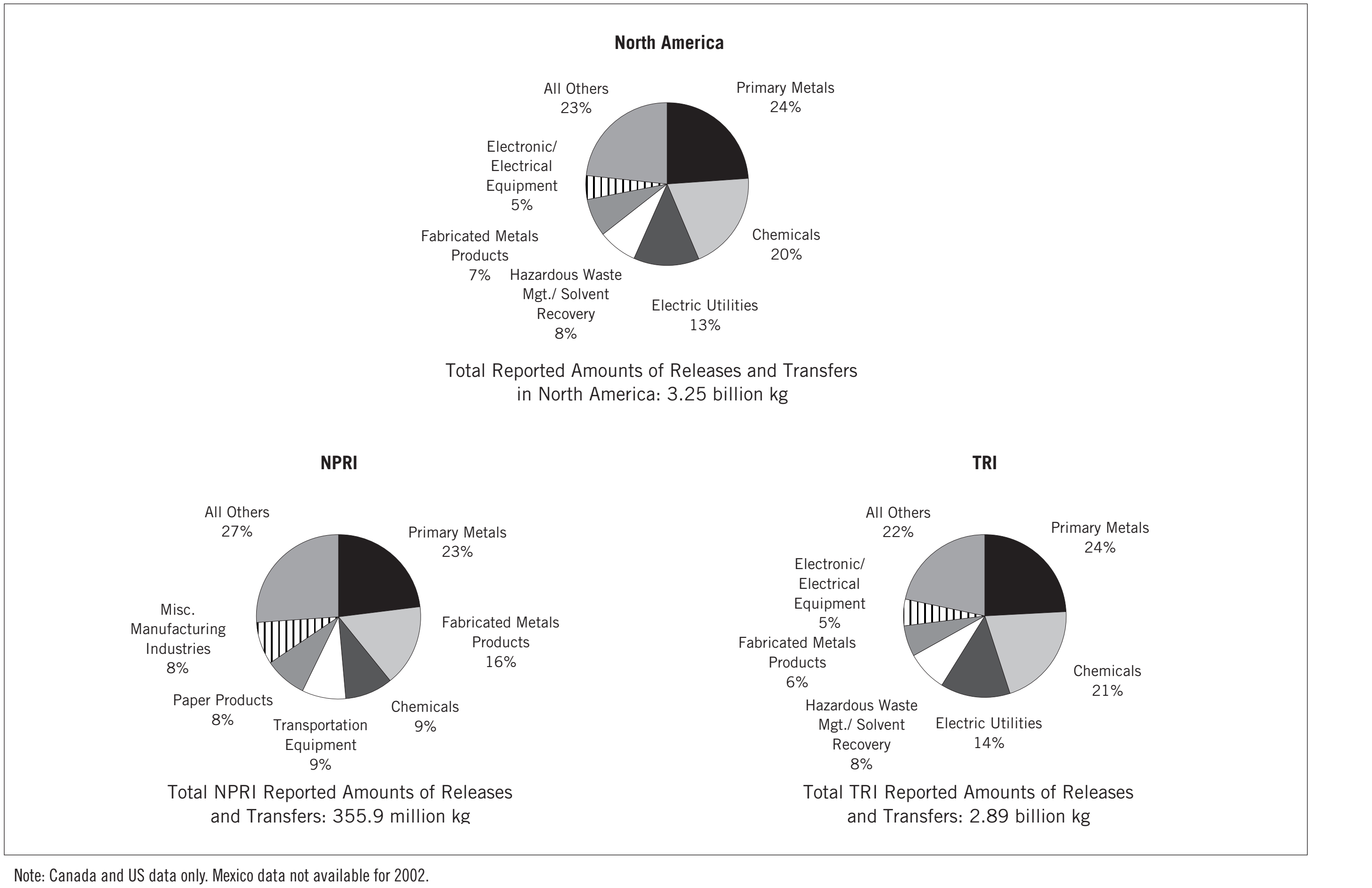
1. select **Chemical** report and select **All** for the number of results to be displayed.
2. select the **year 2002**.
3. select **Canada & USA** for the geographic area, select **All chemicals** for the chemical, select **one particular Industry Sector** (for example, primary metals) for the industrial sector.
4. check all boxes.

Then click on **✓ Run the query**

If you are interested in the top chemicals in a sector, click on the **down arrow** at the top of the release/transfer column you are interested in.

- The primary metals industry, the industry with the largest totals in 2002, accounted for 24 percent of all North American releases and transfers for 2002, a percentage that was similar in NPRI (23 percent) and TRI (24 percent).
- The chemical manufacturing industry, with the second-largest total releases and transfers, accounted for 20 percent of releases and transfers in North America. This industry accounted for 21 percent in TRI, but 9 percent in NPRI.
- The electric utility industry, with the third-largest amount, accounted for 13 percent of the North American total, 14 percent of the TRI total and 7 percent of the NPRI total.
- Hazardous waste management and solvent recovery facilities reported the fourth-largest amount and accounted for 8 percent of total releases and transfers in North America, with 8 percent of the TRI total and 6 percent of the NPRI total.
- The fifth-ranked fabricated metals products sector accounted for 7 percent of the North American total. This industry represented 16 percent of the NPRI total but only 6 percent of the TRI total.

Figure 4–2. Percentage Contribution of Top Industry Sectors to Total Reported Amounts of Releases and Transfers, NPRI and TRI, 2002



Note: Canada and US data only. Mexico data not available for 2002.

Table 4–4. Average Kilograms per Facility of Releases and Transfers in North America, NPRI and TRI, 2002

	NPRI*		TRI		
	Number	Forms/Facility	Number	Forms/Facility	
Total Facilities	2,257		21,935		
Total Forms	8,243	3.7	76,411	3.5	
Releases On- and Off-site	**kg**	**kg/facility**	**kg**	**kg/facility**	**Ratio of Average per Facility (NPRI/TRI)**
On-site Releases	**116,679,060**	**51,697**	**1,157,184,252**	**52,755**	**1.0**
Air	92,691,779	41,069	659,618,425	30,072	1.4
Surface Water	6,301,432	2,792	100,255,181	4,571	0.6
Underground Injection	1,127,288	499	79,591,993	3,629	0.1
Land	16,434,963	7,282	317,718,652	14,485	0.5
Off-site Releases	**30,299,918**	**13,425**	**239,121,207**	**10,901**	**1.2**
Transfers to Disposal (except metals)	4,026,907	1,784	20,689,550	943	1.9
Transfers of Metals**	26,273,011	11,641	218,431,656	9,958	1.2
Total Reported Releases On- and Off-site	**146,978,978**	**65,121**	**1,396,305,459**	**63,657**	**1.0**
Off-site Transfers to Recycling	**177,156,915**	**78,492**	**888,267,172**	**40,495**	**1.9**
Transfers to Recycling of Metals	161,696,034	71,642	761,107,935	34,698	2.1
Transfers to Recycling (except metals)	15,460,881	6,850	127,159,237	5,797	1.2
Other Off-site Transfers for Further Management	**31,747,577**	**14,066**	**609,727,371**	**27,797**	**0.5**
Energy Recovery (except metals)	8,310,365	3,682	349,563,874	15,936	0.2
Treatment (except metals)	15,143,184	6,709	112,594,621	5,133	1.3
Sewage (except metals)	8,294,028	3,675	147,568,875	6,728	0.5
Total Reported Amounts of Releases and Transfers	**355,883,470**	**157,680**	**2,894,300,002**	**131,949**	**1.2**

* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

** Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

4.2.3 Average Releases and Transfers per Facility, NPRI and TRI

- Average releases and transfers were about 20 percent higher for NPRI (157,680 kg per facility) than for TRI (131,949 kg per facility). The ratio of NPRI to TRI average kilograms per facility for total releases and transfers was 1.2 for 2002.
- The NPRI to TRI ratio of per-facility average for total reported releases on- and off-site was 1.0. However, on-site air releases were, on average, higher for NPRI facilities (ratio of 1.4) and the other types of on-site releases (surface water, underground injection and land) were lower.
- Average reported off-site releases (primarily transfers to landfill) were higher for NPRI than TRI (a ratio of 1.2).
- Average off-site transfers to recycling were higher for NPRI than for TRI. The ratio of NPRI to TRI average kilograms per facility for transfers to recycling was 1.9, with the ratio for recycling of metals at 2.1 for 2002.
- The ratio of NPRI to TRI average kilograms per facility for other off-site transfers for further management was 0.5 for 2002. For two of the three types of other off-site transfers for further management—energy recovery and sewage—per-facility averages were considerably smaller for NPRI than for TRI while the average for transfers to treatment was higher for NPRI.

4.2.4 Facilities with the Largest Total Reported Amounts of Releases and Transfers, 2002

The 50 facilities in North America with the largest total releases and transfers reported 677.2 million kg of releases and transfers, 21 percent of the total for the matched data set in 2002.

- The 50 facilities with the largest total releases and transfers in 2002 reported 22 percent of total releases, 15 percent of off-site transfers to recycling, and 28 percent of other off-site transfers for further management. All but four were located in the US.
- Eighteen of the 50 facilities with the largest releases and transfers were primary metals facilities, 11 were hazardous waste management facilities, and 11 were chemical manufacturers.
- Of the 50 facilities, almost half (24 out of 50) reported over 90 percent of their total releases and transfers as releases on- and off-site. Another quarter (12 out of 50) reported over 90 percent of their total as transfers to recycling. Another 11 of the 50 facilities reported over 90 percent of their total as other transfers for further waste management.
- The four facilities with the largest amounts all reported more than 20 million kg each of total releases and transfers.
- The primary metals facility, BHP Copper N.A. San Manuel Ops. in San Manuel, Arizona, reported the largest total, with 112.0 million kg, primarily as on-site land disposal of copper and manganese compounds. The facility reported that it had a one-time amount of on-site land disposal due to discontinued operations related to mining.
- The hazardous waste management facility, EQ Resource Recovery Inc. in Romulus, Michigan, reported the second-largest total, with 32.2 million kg of other transfers for further management (mainly, transfers to energy recovery of xylenes, di(2-ethylhexyl) phthalate and toluene).

Table 4–5. The 50 North American Facilities with the Largest Total Reported Amounts of Releases and Transfers, 2002

			SIC Codes			Releases On- and Off-site		
Rank	Facility	City, State/Province	Canada	US	Number of Forms	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total On-site and Off-site Releases Reported (kg)
1	BHP Copper N.A. San Manuel Ops.	San Manuel, AZ		33	7	111,224,621	1,043	111,225,664
2	EQ Resource Recovery Inc., EQ Holding Co.	Romulus, MI		495/738	35	5,773	3,638	9,411
3	K.C. Recycling Ltd.	Trail, BC	39	39	2	635	0	635
4	Jayhawk Fine Chemicals Corp.	Galena, KS		28	27	9,340	36	9,376
5	Petro-Chem Processing Group/Solvent Distillers Group, Philip Services Corp.	Detroit, MI		495/738	8	486	0	486
6	Pharmacia & Upjohn Co., Pfizer Inc.	Kalamazoo, MI		28	30	179,765	23,560	203,325
7	Revere Smelting & Refining Corp., Eco-Bat New York L.L.C.	Middletown, NY		33	5	393	40,457	40,850
8	Rineco	Benton, AR		495/738	41	1,294	118,473	119,766
9	ASARCO Inc., Ray Complex Hayden Smelter & Concentrator, Americas Mining Corp.	Hayden, AZ		33	12	15,586,734	1,303	15,588,037
10	Pfizer Inc. Parke-Davis Div.	Holland, MI		28	12	1,212,232	182	1,212,415
11	Exide Techs.	Bristol, TN		36	2	359	3,294	3,653
12	Chevron Phillips Chemical Co., Chevron Corp.	Port Arthur, TX		28	17	172,560	32,258	204,818
13	Marisol Inc.	Middlesex, NJ		495/738	17	6,395	133,992	140,387
14	National Steel Corp. Greatlakes Ops.	Ecorse, MI		33	23	124,017	12,492,672	12,616,689
15	US Ecology Idaho Inc., American Ecology Corp.	Grand View, ID		495/738	15	12,688,715	0	12,688,715
16	Nucor Steel, Nucor Corp.	Crawfordsville, IN		33	11	17,629	12,375,940	12,393,569
17	Falconbridge Ltd-Kidd Metallurgical Div., Kidd Metallurgical Site	Timmins/District of Cochrane, ON	29	33	13	317,330	0	317,330
18	Zinc Corp. of America Monaca Smelter, Horsehead Inds.	Monaca, PA		33	12	437,669	11,731,187	12,168,856
19	Solutia Inc.	Cantonment, FL		28	22	11,411,311	1,562	11,412,873
20	Onyx Environmental Services L.L.C.	West Carrollton, OH		495/738	8	193	138,550	138,743
21	Steel Dynamics Inc.	Butler, IN		33	16	275,571	10,420,512	10,696,082
22	AK Steel Corp. (Rockport Works)	Rockport, IN		33	8	10,291,162	223,265	10,514,427
23	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	17	10,096,046	4,339	10,100,384
24	North Star BHP Steel L.L.C., NSS Ventures Inc.	Delta, OH		33	7	22,094	3,234	25,328
25	Southeastern Chemical & Solvent Co. Inc., M&M Chemical & Equipment Co.	Sumter, SC		495/738	5	6,209	0	6,209
26	Georgia Power Bowen Steam Electric Generating Plant, Southern Co.	Cartersville, GA		491/493	14	9,760,636	2	9,760,638
27	Nucor Steel Arkansas, Nucor Corp.	Blytheville, AR		33	10	9,930	480,021	489,950
28	Celanese Ltd. Clear Lake Plant, Celanese Americas Corp.	Pasadena, TX		28	21	305,232	236,491	541,723
29	Peoria Disposal Co. 1, Coulter Cos. Inc.	Peoria, IL		495/738	7	9,287,268	5	9,287,273
30	Johnson Controls Fort Wayne Distribution Center	Fort Wayne, IN		36	1	0	0	0
31	Rouge Steel Co., Rouge Inds. Inc.	Dearborn, MI		33	11	33,573	8,095,377	8,128,950
32	American Electric Power, Amos Plant	Winfield, WV		491/493	13	8,344,553	434,273	8,778,826
33	Karmax Heavy Stamping, Cosma International Inc.	Milton, ON	32	34	4	1,188	0	1,188
34	Safety-Kleen Sys. Inc.	Smithfield, KY		495/738	9	7,854	7	7,860
35	Lenzing Fibers Corp.	Lowland, TN		28	10	8,417,073	0	8,417,073
36	BASF Corp.	Freeport, TX		28	27	8,157,457	19,233	8,176,690
37	Nucor Steel, Nucor Corp.	Huger, SC		33	9	22,946	7,743,059	7,766,005
38	Equistar Chemicals L.P. Victoria Facility	Victoria, TX		28	5	112,588	0	112,588
39	U.S. TVA Johnsonville Fossil Plant	New Johnsonville, TN		491/493	14	7,802,074	5,422	7,807,496
40	Reliant Energy Keystone Power Plant	Shelocta, PA		491/493	12	7,688,282	2	7,688,284
41	Solutia - Chocolate Bayou	Alvin, TX		28	25	7,674,336	282	7,674,618
42	Tenneco Automotive, Walker Cambridge	Cambridge, ON	32	37	4	2,242	0	2,242
43	J & L Specialty Steel L.L.C.	Louisville, OH		33	6	1,330	84,148	85,478
44	Georgia Power Scherer Steam Electric Generating Plant	Juliette, GA		491/493	14	7,456,500	0	7,456,500
45	Nucor-Yamato Steel Co., Nucor Corp.	Blytheville, AR		33	6	9,281	2,602,872	2,612,153
46	Vickery Environmental Inc., Waste Management of Ohio	Vickery, OH		495/738	22	7,109,740	18,105	7,127,845
47	Firestone Polymers, Bridgestone/Firestone Diversified Prods. L.L.C.	Sulphur, LA		28	5	721,369	0	721,369
48	Doe Run Co. Herculaneum Smelter, Renco Group Inc.	Herculaneum, MO		33	8	7,055,001	17,465	7,072,467
49	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738	9	7,011,270	1,957	7,013,227
50	Olin Corp. - Zone 17 Facility	East Alton, IL		33	9	47,739	523,944	571,683
	Subtotal				**647**	**271,127,993**	**68,012,162**	**339,140,155**
	% of Total				**1**	**21**	**25**	**22**
	Total				**84,654**	**1,273,863,312**	**269,421,125**	**1,543,284,437**

Note: Canada and US only. Mexico data not available for 2002. The data are estimates of releases and transfers of chemicals as reported by facilities and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.

Table 4–5. (*continued*)

Rank	Off-site Transfers for Further Management: Total Transfers to Recycling (kg)	Off-site Transfers for Further Management: Other Transfers Off-site for Further Management* (kg)	Total Reported Amounts of Releases and Transfers (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total reported amounts from the facility)
1	775,079	0	112,000,744	Copper/Manganese and compounds (land)
2	0	32,169,139	32,178,551	Xylenes, Di(2-ethylhexyl) phthalate, Toluene (transfers to energy recovery)
3	24,000,000	0	24,000,635	Lead and compounds (transfers to recycling)
4	41,370	22,657,727	22,708,473	Nitric acid and nitrate compounds (transfers to sewage)
5	930	19,848,610	19,850,026	Methanol, Toluene, Xylenes (transfers to energy recovery)
6	122,458	19,151,429	19,477,213	Methanol (transfers to energy recovery), Dichloromethane (transfers to treatment), Toluene (transfers to energy recovery)
7	17,666,219	0	17,707,068	Lead and compounds (transfers to recycling)
8	0	16,722,375	16,842,141	Xylenes, Toluene, Methyl ethyl ketone, Methanol, Styrene (transfers to energy recovery)
9	719,209	0	16,307,246	Copper/Zinc and compounds (land)
10	3,538,070	11,171,288	15,921,773	Methanol (transfers to energy recovery), Toluene (transfers to energy recovery, recycling)
11	14,545,573	0	14,549,226	Lead and compounds (transfers to recycling)
12	12,827,293	510,234	13,542,345	Naphthalene, Benzene (transfers to recycling)
13	0	12,837,497	12,977,884	Toluene, Xylenes, Methanol, Methyl ethyl ketone (transfers to energy recovery)
14	285,429	46,739	12,948,857	Zinc and compounds (transfers of metals to disposal)
15	0	0	12,688,715	Zinc and compounds (land)
16	0	0	12,393,569	Zinc and compounds (transfers of metals to disposal)
17	11,865,249	0	12,182,578	Copper and compounds (transfers to recycling)
18	0	0	12,168,856	Zinc and compounds (transfers of metals to disposal)
19	24,598	0	11,437,470	Nitric acid and nitrate compounds (UIJ)
20	0	10,611,864	10,750,607	Xylenes, Toluene (transfers to energy recovery)
21	10,726	0	10,706,808	Zinc and compounds (transfers of metals to disposal)
22	9,328	0	10,523,755	Nitric acid and nitrate compounds (water)
23	0	227	10,100,611	Copper/Zinc and compounds (land)
24	10,032,215	0	10,057,543	Zinc and compounds (transfers to recycling)
25	0	9,755,974	9,762,182	Toluene, Methyl ethyl ketone (transfers to energy recovery)
26	1	0	9,760,638	Hydrochloric acid (air)
27	9,268,771	0	9,758,722	Zinc and compounds (transfers to recycling)
28	0	9,171,229	9,712,953	Acrylic acid (transfers to energy recovery, sewage), Ethylene glycol (transfers to sewage), Diethyl sulfate (transfers to energy recovery)
29	0	0	9,287,273	Zinc and compounds (land)
30	8,979,129	0	8,979,130	Lead and compounds (transfers to recycling)
31	822,336	2,255	8,953,541	Zinc/Manganese and compounds (transfers of metals to disposal)
32	53,176	0	8,832,001	Hydrochloric acid (air)
33	8,797,320	0	8,798,508	Zinc and compounds (transfers to recycling)
34	0	8,500,795	8,508,655	Toluene, Methyl ethyl ketone, Xylenes, Methanol (transfers to energy recovery)
35	0	0	8,417,073	Carbon disulfide (air)
36	12,250	25,345	8,214,284	Nitric acid and nitrate compounds (water)
37	139,246	0	7,905,252	Zinc and compounds (transfers of metals to disposal)
38	0	7,707,695	7,820,283	Ethylene (transfers to energy recovery)
39	3	0	7,807,499	Hydrochloric acid (air)
40	0	0	7,688,284	Hydrochloric acid (air)
41	0	0	7,674,618	Acrylonitrile, Acrylic acid (UIJ)
42	7,575,000	0	7,577,242	Chromium/Nickel and compounds (transfers to recycling)
43	7,214,090	225,138	7,524,707	Chromium/Nickel and compounds (transfers to recycling)
44	15	0	7,456,515	Hydrochloric acid (air)
45	4,794,808	0	7,406,961	Zinc and compounds (transfers to recycling, transfers of metals to disposal)
46	0	1,235	7,129,080	Nitric acid and nitrate compounds, Hydrogen fluoride (UIJ)
47	5,492,280	886,559	7,100,208	1,3-Butadiene (transfers to recycling)
48	0	0	7,072,467	Zinc and compounds, Aluminum (land)
49	0	0	7,013,227	Zinc/Manganese and compounds (land)
50	6,436,732	0	7,008,415	Copper and compounds (transfers to recycling)
	156,048,903	**182,003,355**	**677,192,413**	
	15	**28**	**21**	
	1,065,424,087	**641,474,948**	**3,250,183,472**	

* Includes transfers to energy recovery, treatment and sewage, except for metals, which are included in off-site releases.
UIJ = underground injection.

- The facility with the third-largest amount was the K.C. Recycling Ltd. facility in Trail, British Columbia. It reported 24 million kg of lead and its compounds transferred to recycling. It reported for the first time in 2002.
- The facility with the fourth-largest amount was the Jayhawk Fine Chemicals Corp. facility in Galena, Kansas. It reported mainly transfers of nitrate compounds to sewage.
- Petro-Chem Processing Group/Solvent Distillers Group owned by Philips Services in Detroit, Michigan, reported the fifth-largest total, mainly as transfers to energy recovery of methanol, xylenes and toluene. More than 3.2 million kg of the transfers to energy recovery were sent across the border to sites in Ontario also owned by Philips Services.

5

Releases On-site and Off-site, 2002

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Key Findings

- In 2002, North American facilities released 1.50 billion kg of matched chemicals on- and off-site, based on the matched set of data reported to the US TRI and the Canadian NPRI. On-site releases are releases to air, water, land, or underground injection wells at the site of the facility. Off-site releases include all transfers to disposal and transfers of metals to sewage, treatment, and energy recovery.
- On-site releases accounted for 84 percent of total releases in North America in 2002, and off-site releases, for 16 percent. Half (50 percent) of total releases were on-site air emissions. On-site land releases made up 22 percent. Transfers of metals to disposal, sewage, treatment, or energy recovery accounted for 14 percent.
- The pattern of releases differed between NPRI and TRI. While on-site air emissions made up 49 percent of total releases in TRI, they accounted for 65 percent of total releases in NPRI. On the other hand, TRI had proportionately larger on-site land releases (23 percent versus 12 percent for NPRI).
- More than one-quarter of all releases originated in four states—Arizona, Ohio, Texas, and Indiana. Arizona had the largest releases, with 129.5 million kg, but one facility accounted for 111.2 million kg. Without reporting by this one facility, Arizona would rank 23rd. Ohio had the second-largest total releases, with 101.3 million kg. Texas was third, with 97.3 million kg, Indiana was fourth, with 93.6 million kg, and Pennsylvania was fifth, with 71.2 million kg. Ontario, the Canadian province with the largest releases, ranked sixth, with 68.9 million kg.
- Electric utilities reported the largest total releases of any matched industry sector in North America, with 418.1 million kg. The primary metals sector accounted for the second-largest total releases, with 355.5 million kg, and the chemicals sector was third, with 216.0 million kg.
- The 50 facilities with the largest reported releases in 2002 accounted for almost a third (31 percent) of total reported releases in North America. They included 19 electric utilities and 15 primary metals facilities.

5.1 Introduction

This chapter examines reporting of releases on- and off-site of 203 chemicals from industrial facilities in North America in 2002. On-site releases—to air, water, land, or underground injection wells—occur at the facility. Off-site releases represent transfers to other locations for disposal and transfers of metals to disposal, sewage, treatment, and energy recovery facilities. As explained in **Chapter 2**, the analysis covers the common set of industries and chemicals for which reports must be filed in the United States and Canada (the matched data set). Mexican data are not available for the 2002 reporting year.

The chapter begins with a summary of 2002 releases for North America and for the Canadian NPRI and the US TRI separately. The data are next broken down by state and province, and by industry sector. Information is also presented for the 50 facilities with the largest total reported releases.

5.2 Releases On- and Off-site in North America, 2002

The term **on-site releases** refers to releases to air, water, underground injection, and land at the site of the facility. **Off-site releases** refers to transfers to disposal (except metals) and transfers of metals off the facility site to disposal, sewage, treatment, or energy recovery facilities. **Total reported releases on- and off-site** refers to the sum of these two groups.

Some facilities report transfers to disposal that are in turn reported by other NPRI or TRI facilities as on-site releases. For example, a facility may transfer waste to a hazardous waste treatment facility, where it is landfilled on-site (reported as on-site land releases). Total releases in this chapter are adjusted so that the material is included only once. The amount called **total releases on- and off-site adjusted** or simply **total releases** omits the transfers but includes the on-site releases for amounts that are reported by two facilities. (See **Chapter 2** for a further explanation of the categories used in this report.)

- In 2002, 24,192 North American facilities in industries covered by both the NPRI and the TRI filed 84,654 reports on the substances that are common to both PRTRs. Facilities reporting to Canada's NPRI represented 9 percent of all North American facilities in the matched data set, while US TRI facilities accounted for 91 percent.
- Total releases in North America were 1.50 billion kg in 2002 for the matched data set. Most of the North American reporting occurs in the United States, with its larger industrial base. TRI facilities reported 90 percent of the North American releases.
- On-site releases were 1.27 billion kg, or 84 percent of total releases in North America. Off-site releases, adjusted to take into account transfers to other facilities that reported them as on-site releases, were 228.4 million kg, 16 percent of total releases.

Table 5–1. Summary of Releases On- and Off-site in North America, NPRI and TRI, 2002

	North America Number	NPRI* Number	TRI Number	NPRI as % of North American Total	TRI as % of North American Total
Total Facilities	24,192	2,257	21,935	9	91
Total Forms	84,654	8,243	76,411	10	90
Releases On- and Off-site	**kg**	**kg**	**kg**		
On-site Releases	**1,273,863,312**	**116,679,060**	**1,157,184,252**	**9**	**91**
Air	752,310,204	92,691,779	659,618,425	12	88
Surface Water	106,556,614	6,301,432	100,255,181	6	94
Underground Injection	80,719,282	1,127,288	79,591,993	1	99
Land	334,153,615	16,434,963	317,718,652	5	95
Off-site Releases	**269,421,125**	**30,299,918**	**239,121,207**	**11**	**89**
Transfers to Disposal (except metals)	24,716,457	4,026,907	20,689,550	16	84
Transfers of Metals**	244,704,667	26,273,011	218,431,656	11	89
Total Reported Releases On- and Off-site	**1,543,284,437**	**146,978,978**	**1,396,305,459**	**10**	**90**
Off-site Releases Omitted for Adjustment Analysis***	41,028,398	3,780,286	37,248,112	9	91
Total Releases On- and Off-site (adjusted)**	**1,502,256,039**	**143,198,692**	**1,359,057,347**	**10**	**90**

Note: Canada and US data only. Mexico data not available for 2002. Data include 203 chemicals common to both NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data, in combination with other information, can be used as a starting point in evaluating exposures that may result from releases and other management activities which involve these chemicals.

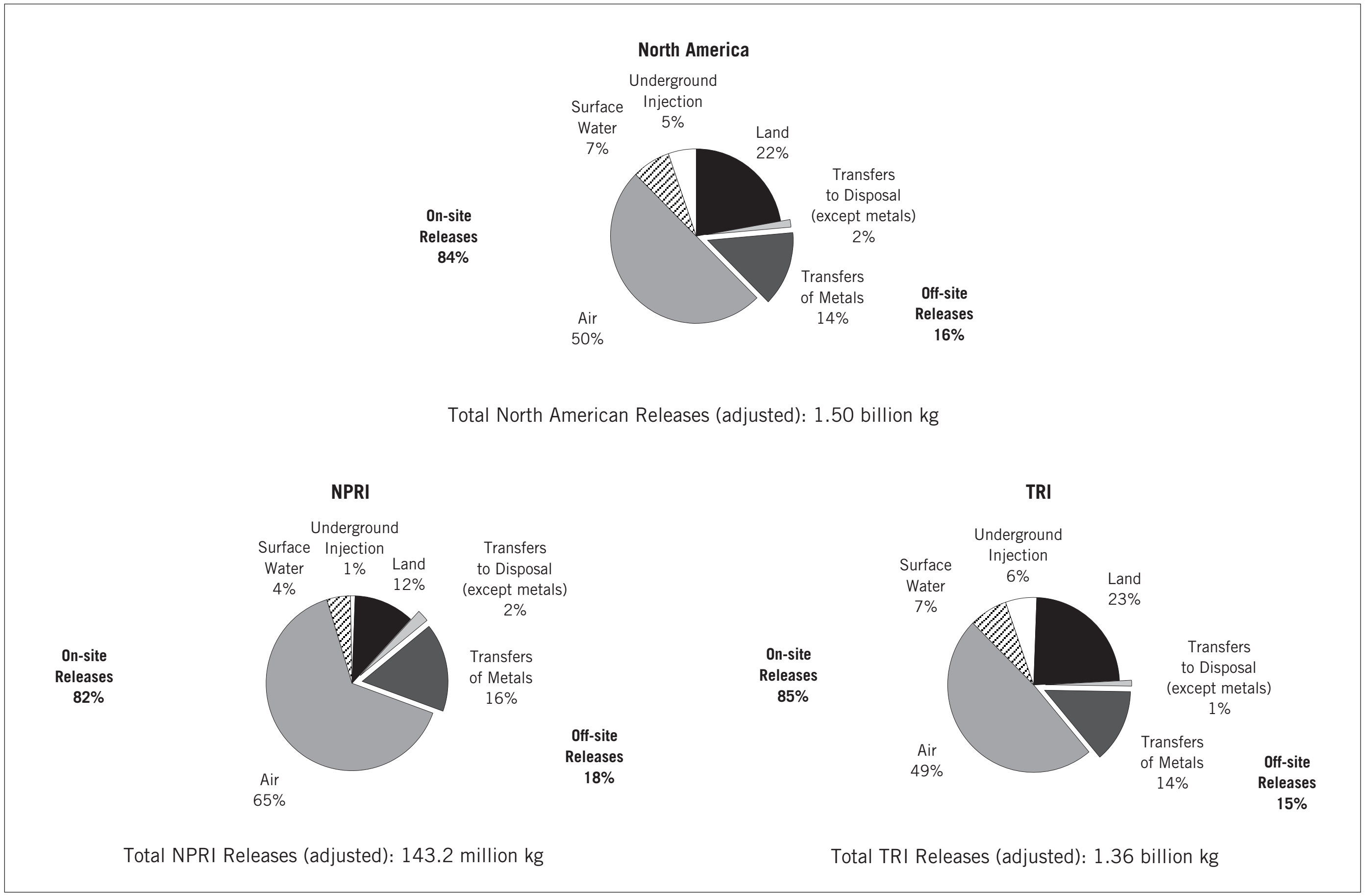
* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

** Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

*** Off-site releases also reported as on-site releases by another NPRI or TRI facility. This amount is subtracted from total reported releases on- and off-site to get total releases on- and off-site (adjusted).

**** Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

Figure 5–1. Percentage of Releases On-site and Off-site in North America by Type, NPRI and TRI, 2002



Note: Canada and US data only. Mexico data not available for 2002. Off-site releases and total releases do not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

- For NPRI, on-site air releases accounted for almost two-thirds (65 percent) of NPRI total releases. For TRI, on-site air releases were almost half (49 percent) of the TRI total.
- Off-site releases made up 18 percent of NPRI total releases, and 15 percent of the TRI total.
- TRI facilities reported proportionately larger on-site releases to surface waters (7 percent for TRI and 4 percent for NPRI) and on-site underground injection (6 percent for TRI and 1 percent for NPRI).

5.2.1 Releases On- and Off-site, by State and Province, 2002

More than one-quarter of all North American releases originated in four states.

- Arizona reported the largest releases, with 129.5 million kg, or 9 percent of the North American total. One primary metals facility, BHP Copper N.A. San Manuel Ops. in San Manuel, Arizona, reported more than 85 percent of the state's total releases, with 111.2 million kg, primarily as on-site land disposal of copper and manganese compounds. The facility reported that it had a one-time amount of on-site land disposal due to discontinued operations related to mining. Without reporting by this one facility, Arizona would rank 23rd for total releases.
- Ohio reported the second-largest releases with 101.3 million kg (almost 7 percent of the North American total) and the largest on-site air emissions, with several electric generating facilities contributing significantly to its total on-site air emissions.
- Texas reported the third-largest total releases, 97.3 million kg (over 6 percent of the North American total). Texas also had the largest releases on-site to underground injection (30.7 million kg, over one-third of the total in this category) and to surface waters (13.4 million kg, 13 percent of the total in this category).
- Indiana reported the fourth-largest total releases (93.6 million kg or 6 percent of the North American total), including the largest total off-site transfers of metals (39.3 million kg, or 16 percent of the North American total) and the largest total off-site releases.
- Pennsylvania ranked fifth in North America for total releases, with 71.2 million kg, and ranked third for total off-site releases.

Table 5–2. Releases On- and Off-site in North America, by State and Province, 2002

		On-site Releases					
State/Province	Number of Facilities	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases kg	Rank
Alabama	503	26,903,961	2,482,092	2,317	15,331,684	44,720,055	11
Alaska	16	98,267	17,954	3	1,562	117,786	61
Alberta	187	7,985,665	888,784	1,104,423	1,990,529	11,980,065	28
Arizona	232	1,529,101	659	988,702	126,837,437	129,355,899	1
Arkansas	340	6,142,774	1,477,390	1,511,314	1,985,757	11,117,235	30
British Columbia	140	9,861,409	1,286,292	0	962,134	12,122,771	27
California	1,370	5,539,189	2,532,239	11,876	6,450,742	14,534,047	26
Colorado	194	1,244,412	2,254,741	0	524,069	4,023,221	43
Connecticut	327	1,561,707	338,850	0	153	1,900,711	52
Delaware	67	2,581,183	418,596	0	246,887	3,246,666	46
District of Columbia	5	27,005	148	0	147	27,301	64
Florida	636	33,640,398	874,154	11,435,196	9,455,161	55,404,908	6
Georgia	678	42,464,792	4,554,415	0	3,473,409	50,492,616	7
Guam	5	70,551	0	0	41	70,593	63
Hawaii	26	1,034,778	20,351	2	1	1,055,131	56
Idaho	82	928,506	2,286,145	0	14,452,447	17,667,098	23
Illinois	1,182	23,604,014	3,256,794	0	14,733,627	41,594,436	13
Indiana	986	33,847,101	12,610,739	109,229	9,568,629	56,135,698	5
Iowa	396	8,285,913	1,350,011	0	671,525	10,307,449	31
Kansas	273	4,938,360	318,366	275,284	1,027,386	6,559,396	37
Kentucky	461	25,647,247	1,167,132	2,392	7,676,025	34,492,796	15
Louisiana	350	19,265,064	4,889,238	12,738,993	6,285,831	43,179,127	12
Maine	91	1,547,533	1,637,176	0	292,421	3,477,130	44
Manitoba	71	3,196,240	108,318	0	141,371	3,450,892	45
Maryland	174	14,871,862	1,466,668	24,000	1,670,297	18,032,827	22
Massachusetts	524	2,342,855	29,546	0	42,504	2,414,904	50
Michigan	872	23,655,553	325,517	1,228,393	2,065,716	27,275,179	16
Minnesota	449	4,854,730	560,724	0	1,361,847	6,777,302	36
Mississippi	309	12,054,640	3,892,364	5,252,059	2,677,048	23,876,112	20
Missouri	543	12,605,161	1,943,086	0	11,055,215	25,603,462	18
Montana	33	1,785,191	42,936	0	1,126,572	2,954,698	49
Nebraska	166	3,086,789	5,873,683	0	998,124	9,958,597	32
Nevada	65	863,225	7,462	0	2,262,112	3,132,799	47
New Brunswick	32	4,630,454	786,168	0	329,094	5,747,597	39
New Hampshire	131	1,845,276	2,655	0	5,277	1,853,209	53
New Jersey	517	5,592,319	2,156,829	0	139,463	7,888,612	34
New Mexico	67	407,504	1,283	103	974,918	1,383,807	55
New York	691	11,053,744	2,920,148	0	1,938,816	15,912,708	25
Newfoundland and Labrador	6	715,627	30,318	0	85,815	831,760	57
North Carolina	803	41,848,642	3,872,296	0	3,346,787	49,067,725	9
North Dakota	41	1,716,139	76,373	0	1,331,237	3,123,749	48
Northern Marianas	3	2,526	0	0	1	2,527	65
Nova Scotia	42	4,172,733	124,574	0	940,476	5,238,245	40
Ohio	1,542	52,481,666	3,412,452	12,306,868	14,676,122	82,877,107	3
Oklahoma	303	4,598,684	1,388,914	5,963	1,120,281	7,113,841	35
Ontario	1,256	48,189,898	1,519,646	0	8,335,440	58,123,712	4
Oregon	264	4,772,037	1,162,449	0	3,689,342	9,623,828	33
Pennsylvania	1,312	38,016,923	4,328,307	0	4,319,457	46,664,687	10
Prince Edward Island	5	17,996	209,132	0	48	227,176	60
Puerto Rico	133	4,327,150	1,853	0	133,268	4,462,271	41
Quebec	480	12,692,146	1,323,260	51	3,433,471	17,462,054	24
Rhode Island	127	276,002	5,598	0	125	281,725	59
Saskatchewan	38	1,229,609	24,939	22,814	216,586	1,494,790	54
South Carolina	511	22,161,937	1,247,050	0	1,931,306	25,340,293	19
South Dakota	81	575,424	1,056,857	0	518,666	2,150,947	51
Tennessee	611	39,406,597	995,403	0	9,712,052	50,114,052	8
Texas	1,354	37,612,690	13,367,806	30,726,959	9,225,405	90,932,859	2
Utah	168	8,168,202	19,468	0	14,309,368	22,497,038	21
Vermont	38	20,613	51,954	0	408	72,975	62
Virgin Islands	5	188,331	96,025	0	3,573	287,929	58
Virginia	451	21,770,060	3,614,871	0	1,626,534	27,011,464	17
Washington	311	4,470,613	645,264	0	1,319,974	6,435,851	38
West Virginia	206	30,841,164	1,835,790	7	3,703,173	36,380,134	14
Wisconsin	870	9,876,038	1,361,962	0	559,637	11,797,638	29
Wyoming	40	566,282	4,396	2,972,336	859,083	4,402,096	42
Total	**24,192**	**752,310,204**	**106,556,614**	**80,719,282**	**334,153,615**	**1,273,863,312**	

Note: Canada and US data only. Mexico data not available for 2002. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings are meant to imply that a facility, state or province is not meeting its legal requirements. The data do not predict levels of exposure of the public to those chemicals.

Table 5–2. (*continued*)

Off-site Releases				Total Releases									
Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases kg	Total Off-site Releases Rank	Total Reported Releases On- and Off-site kg	Total Reported Releases On- and Off-site Rank	Adjustment Component* (kg)	Total Releases (adjusted)** kg	Total Releases (adjusted)** Rank	2002 Population***	Land Area (sq km)	2002 Gross Domestic Product**** US$ millions	2002 Gross Domestic Product**** Rank
1,686,746	6,872,762	8,559,507	9	53,279,562	12	1,508,015	51,771,547	13	4,478,896	131,432	125,567	27
17	390	407	62	118,193	62	389	117,805	62	641,482	1,477,155	29,708	51
698,913	2,462,033	3,160,946	26	15,141,011	31	499,799	14,641,212	28	3,114,400	661,194	95,519	32
68,480	144,116	212,597	50	129,568,495	1	55,392	129,513,103	1	5,441,125	294,310	171,781	23
139,268	3,983,037	4,122,306	15	15,239,541	30	2,022,101	13,217,440	30	2,706,268	134,864	71,929	38
179,849	2,382,619	2,562,468	27	14,685,240	32	45,661	14,639,578	29	4,115,000	947,806	86,320	35
1,038,349	2,638,013	3,676,362	19	18,210,409	26	1,500,471	16,709,939	27	35,001,986	403,939	1,367,785	1
10,130	515,807	525,937	45	4,549,158	46	77,153	4,472,005	47	4,501,051	268,637	179,410	22
155,868	3,369,521	3,525,389	20	5,426,099	41	201,998	5,224,101	41	3,458,587	12,548	165,744	24
982	1,838,621	1,839,603	30	5,086,269	42	89	5,086,180	42	805,945	5,063	47,150	44
0	135	135	64	27,435	64	0	27,435	64	569,157	158	66,440	40
336,464	806,170	1,142,634	37	56,547,543	7	29,441	56,518,102	7	16,691,701	139,841	520,500	4
82,004	1,609,074	1,691,078	33	52,183,694	13	140,026	52,043,668	12	8,544,005	149,999	305,829	10
396	0	396	63	70,990	63	0	70,990	63	161,057	550	--	--
714	20,803	21,517	59	1,076,648	56	14	1,076,635	56	1,240,663	16,634	43,998	47
25,281	139,768	165,049	51	17,832,147	27	14,044	17,818,103	24	1,343,124	214,309	38,558	49
1,461,417	12,774,575	14,235,992	5	55,830,427	8	3,606,098	52,224,329	11	12,586,447	143,975	486,139	5
648,234	39,250,828	39,899,063	1	96,034,761	4	2,403,975	93,630,786	4	6,156,913	92,896	204,946	16
360,580	5,107,081	5,467,661	12	15,775,110	29	3,634,148	12,140,962	32	2,935,840	144,705	98,232	31
487,731	3,406,492	3,894,223	16	10,453,618	34	134,013	10,319,606	34	2,711,769	211,905	89,508	34
217,754	3,000,173	3,217,926	24	37,710,723	16	166,786	37,543,937	16	4,089,822	102,898	122,282	29
653,261	1,802,737	2,455,999	28	45,635,125	14	293,277	45,341,849	14	4,476,192	112,827	131,584	26
25,487	399,397	424,884	47	3,902,014	50	44,469	3,857,545	50	1,294,894	79,934	39,039	48
5,976	1,343,339	1,349,315	36	4,800,207	44	0	4,800,207	44	1,155,500	649,953	23,609	54
47,763	796,158	843,921	42	18,876,748	24	15,089	18,861,658	23	5,450,525	25,315	201,879	17
72,951	951,574	1,024,525	39	3,439,429	51	51,213	3,388,215	51	6,421,800	20,299	288,088	13
1,348,352	25,637,444	26,985,796	2	54,260,975	9	170,014	54,090,961	8	10,043,221	147,124	351,287	9
34,504	2,332,049	2,366,553	29	9,143,854	36	89,197	9,054,657	36	5,024,791	206,192	200,061	18
59,573	458,250	517,823	46	24,393,935	21	4,247	24,389,687	20	2,866,733	121,498	69,136	39
99,681	3,099,883	3,199,563	25	28,803,026	19	36,647	28,766,379	19	5,669,544	178,432	187,543	21
1,088	67,255	68,343	55	3,023,041	52	6,151	3,016,890	52	910,372	376,961	23,773	53
393,995	8,573,742	8,967,737	8	18,926,334	23	6,034,738	12,891,596	31	1,727,564	199,099	60,962	41
124,676	756,167	880,842	40	4,013,641	48	617	4,013,024	48	2,167,455	284,376	81,182	36
27,458	1,012,486	1,039,944	38	6,787,541	39	514,598	6,272,943	39	750,200	73,440	13,477	60
10,658	79,354	90,012	54	1,943,221	55	769	1,942,452	55	1,274,405	23,228	46,448	45
146,089	1,655,606	1,801,695	31	9,690,307	35	11,509	9,678,798	35	8,575,252	19,214	380,169	8
19,579	551,339	570,918	44	1,954,725	54	9	1,954,716	54	1,852,044	314,311	53,515	43
273,034	1,369,550	1,642,584	34	17,555,291	28	144,887	17,410,404	26	19,134,293	122,301	792,058	2
1,260	45,760	47,020	57	878,780	57	30	878,750	57	519,300	405,721	10,542	61
1,267,213	3,026,501	4,293,714	14	53,361,439	11	392,771	52,968,668	10	8,305,820	126,170	300,216	12
2,487	866,958	869,445	41	3,993,194	49	142	3,993,052	49	633,911	178,681	19,780	57
0	0	0	65	2,527	65	0	2,527	65	74,003	477	--	--
46,890	209,723	256,613	48	5,494,858	40	17,028	5,477,830	40	934,400	55,491	17,259	59
2,771,887	19,696,287	22,468,175	4	105,345,282	2	4,058,522	101,286,760	2	11,408,699	106,060	388,224	7
74,642	1,336,002	1,410,644	35	8,524,485	37	18,235	8,506,250	37	3,489,700	177,865	95,126	33
2,516,717	10,998,975	13,515,692	6	71,639,404	5	2,702,337	68,937,066	6	12,096,600	1,068,586	304,462	11
25,053	3,669,753	3,694,806	18	13,318,634	33	2,882,312	10,436,322	33	3,520,355	248,629	115,138	30
738,513	24,214,156	24,952,668	3	71,617,355	6	462,797	71,154,558	5	12,328,827	116,075	428,950	6
0	38,613	38,613	58	265,788	60	16	265,773	60	137,000	5,659	2,387	62
62,051	186,024	248,075	49	4,710,346	45	11,708	4,698,638	45	3,859,000	8,950	57,800	42
510,750	4,403,711	4,914,461	13	22,376,515	22	705	22,375,810	22	7,443,500	1,540,689	156,372	25
29,879	78,226	108,105	53	389,829	58	2,336	387,493	58	1,068,326	2,706	36,988	50
39,094	3,375,751	3,414,845	22	4,909,635	43	112	4,909,522	43	995,500	652,334	22,028	55
88,235	9,328,185	9,416,420	7	34,756,714	17	1,769,354	32,987,359	17	4,103,770	77,981	122,354	28
172	14,938	15,110	60	2,166,057	53	231	2,165,826	53	760,437	196,555	25,003	52
486,453	2,840,868	3,327,321	23	53,441,373	10	43,282	53,398,091	9	5,789,796	106,752	190,122	20
3,297,284	4,151,698	7,448,982	10	98,381,841	3	1,094,040	97,287,801	3	21,736,925	678,305	773,455	3
85,504	3,422,657	3,508,161	21	26,005,199	20	2,998,751	23,006,449	21	2,318,789	212,799	72,974	37
27,177	41,040	68,217	56	141,192	61	69	141,124	61	616,408	23,953	19,604	58
43	5,629	5,671	61	293,600	59	2,732	290,868	59	108,810	340	--	--
282,548	3,588,393	3,870,941	17	30,882,406	18	14,020	30,868,385	18	7,287,829	102,551	287,589	14
290,989	517,637	808,625	43	7,244,476	38	43,879	7,200,597	38	6,067,060	172,431	232,940	15
222,778	1,549,877	1,772,655	32	38,152,789	15	87,763	38,065,026	15	1,804,884	62,381	45,518	46
904,731	5,758,916	6,663,647	11	18,461,284	25	968,015	17,493,269	25	5,439,692	140,662	190,650	19
809	130,040	130,849	52	4,532,945	47	164	4,532,781	46	498,830	251,483	20,285	56
24,716,457	**244,704,667**	**269,421,125**		**1,543,284,437**		**41,028,398**	**1,502,256,039**					

* Off-site releases also reported as on-site releases by another NPRI or TRI facility. This amount is subtracted from total reported releases on- and off-site to get total releases (adjusted).

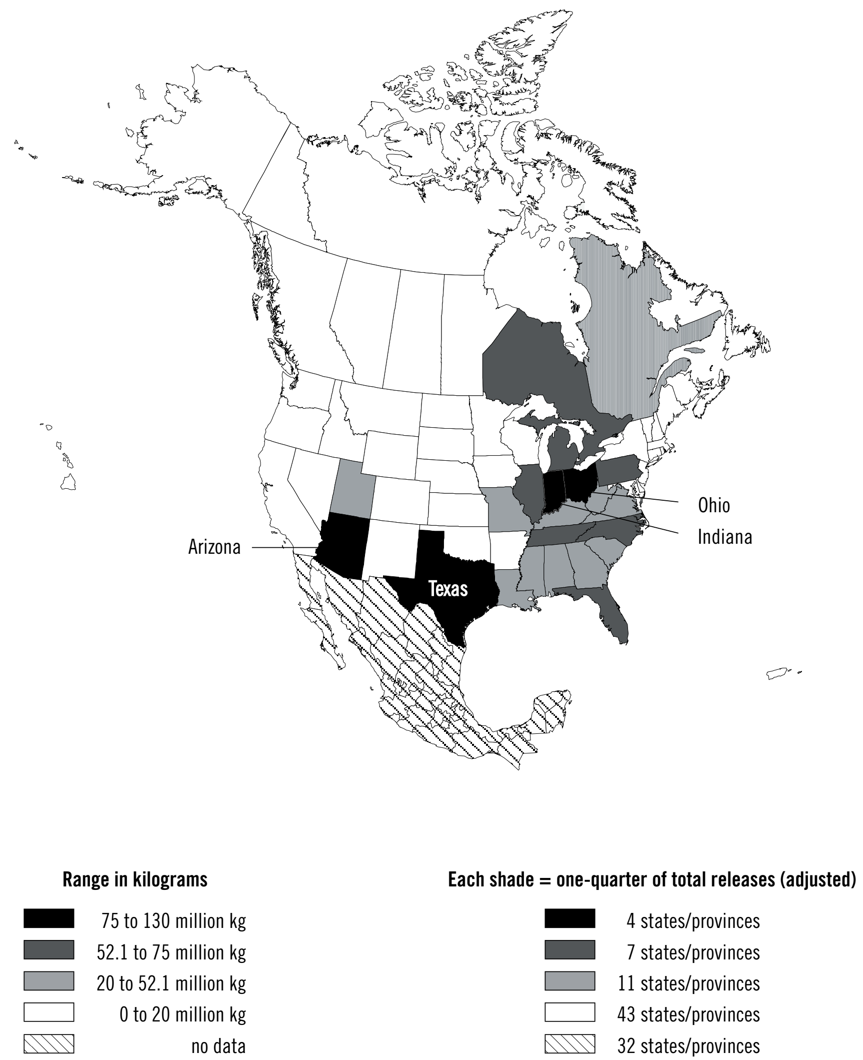
** Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

*** Population data for Canada from <http://www.statcan.ca/english/Pgdb/demo02.htm> (accessed 23 September 2004) and for United States from <http://www.census.gov/popest/states/NST-ann-est.html> (accessed 23 September 2003). For Guam, the Northern Marianas, Puerto Rico and Virgin Islands from <http://www.census.gov/ipc/www/idbsum.html>.

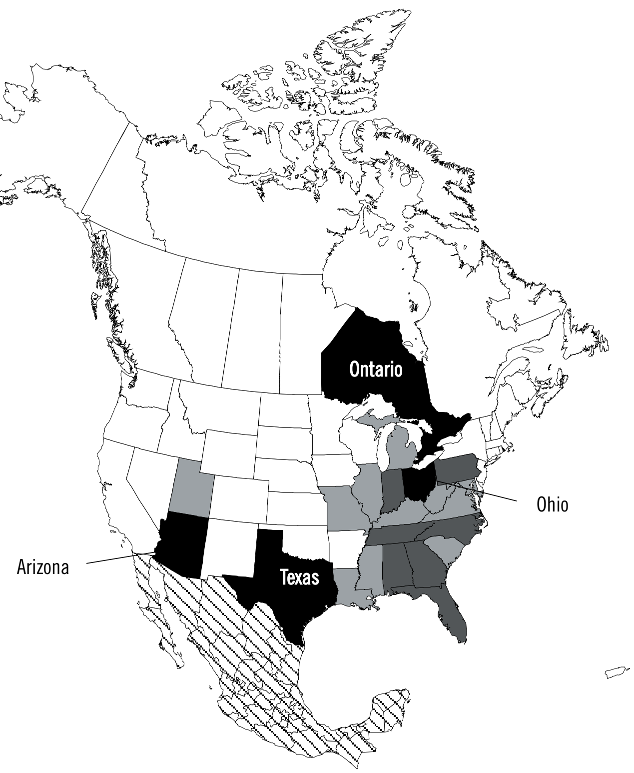
**** Gross Domestic product for Canada from <http://www.statcan.ca/english/Pgdb/econ15.htm> (2002 data, accessed 23 September 2004) with exchange rate of US$0.6368 per C$ from <http://www.statcan.ca/english/Pgdb/econ07.htm> (2002 data, accessed 23 September 2004) and for United States from <http://www.bea.doc.gov/bea/newsrel/gsp0503.xls> (2002 data, accessed 10 September 2003).

- Ontario, the Canadian province with the largest releases, ranked sixth in North America, with 68.9 million kg, and had the second-largest air releases and third-largest off-site transfers of substances other than metals off-site to disposal in North America.

Map 5–1. Largest Sources of Total Releases On-site and Off-site (adjusted) in North America, 2002: States and Provinces

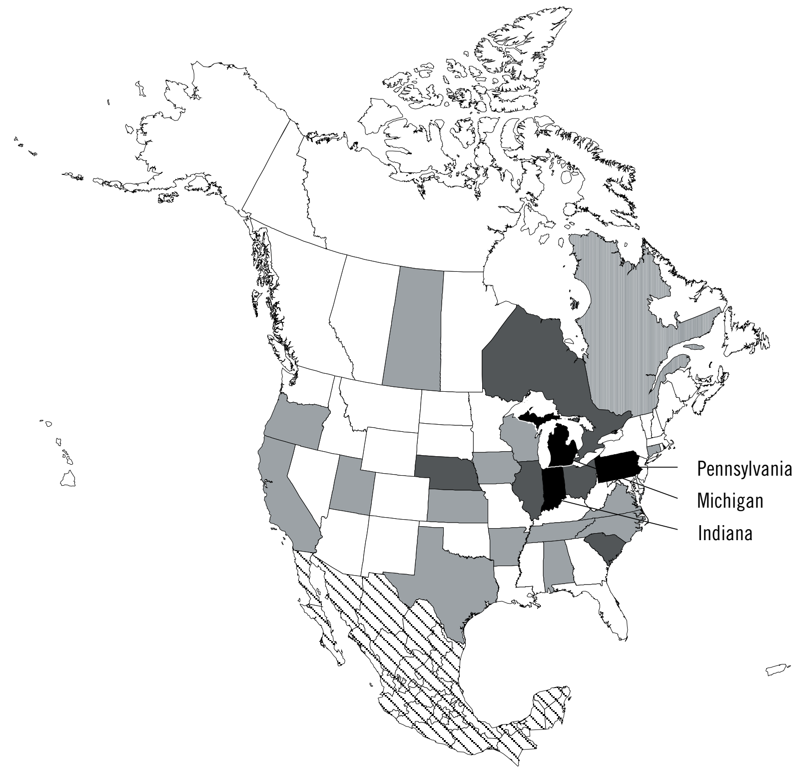


Map 5–2. Largest Sources of On-site Releases in North America, 2002: States and Provinces



Range in kilograms		Each shade = one-quarter of total releases on-site
(black)	58 to 130 million kg	4 states/provinces
(dark gray)	44 to 58 million kg	7 states/provinces
(light gray)	18 to 44 million kg	11 states/provinces
(white)	0 to 18 million kg	43 states/provinces
(hatched)	no data	32 states/provinces

Map 5–3. States and Provinces in North America Sending Largest Amounts of Off-site Releases (Off-site Transfers to Disposal), 2002



Range in kilograms		Each shade = one-quarter of total releases off-site
(black)	24 to 40 million kg	3 states/provinces
(dark gray)	8.6 to 24 million kg	5 states/provinces
(light gray)	3.3 to 8.6 million kg	15 states/provinces
(white)	0 to 3.3 million kg	42 states/provinces
(hatched)	no data	32 states/provinces

5.2.2 Releases On- and Off-site by Industry, 2002

Among industry sectors, electric utilities reported the largest total on- and off-site releases in 2002. Ranking next were the primary metals, chemical manufacturing, paper products, and hazardous waste management and solvent recovery facilities. These five sectors accounted for more than three-quarters (78 percent) of total releases in 2002.

- Electric utilities reported 418.1 million kg of total releases on- and off-site, the largest amount of any industry. Releases from electric utilities represented 28 percent of the North American total and 46 percent of all North American on-site air emissions in 2002. More than 50 percent of the total reported releases and transfers by this industry were on-site air releases of hydrochloric acid.
- Primary metals facilities reported 355.5 million kg in total releases, 24 percent of the North American total. This included 176.5 million kg (53 percent) of on-site land releases, the most of any industry. Primary metals facilities also reported the most metals released off-site—157.7 million kg, or 64 percent of the total for all industry sectors. Over 50 percent of this industry's total releases were zinc and copper and their compounds transferred to disposal off-site or to on-site land disposal.
- The chemical manufacturing sector reported 216.0 million kg of total releases in 2002, 14 percent of the North American total. This sector had by far the largest amount of underground injection, 70.2 million kg, or 87 percent of the total for the category. Nitric acid and nitrate compounds, manganese and its compounds, methanol, ethylene, carbon disulfide and acetonitrile were the chemicals with the largest amounts released by this industry.

Table 5–3. Releases On- and Off-site in North America, by Industry, 2002

		On-site Releases					Off-site Releases		
US SIC Code	Industry	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)
491/493	Electric Utilities	342,728,952	939,281	2	59,857,107	403,525,341	267,086	14,384,484	14,651,570
33	Primary Metals	28,300,547	19,732,613	1,186,076	176,452,032	225,683,311	2,745,374	157,735,053	160,480,427
28	Chemicals	84,636,943	25,176,844	70,215,496	17,118,682	197,184,982	9,132,303	14,228,855	23,361,158
26	Paper Products	82,292,091	9,897,255	50	8,520,843	100,713,102	150,663	2,847,899	2,998,562
495/738	Hazardous Waste Mgt./Solvent Recovery	611,587	132,844	7,823,356	57,834,382	66,406,833	3,763,067	18,858,387	22,621,454
20	Food Products	19,366,808	32,367,032	16,216	5,709,695	57,459,919	1,862,269	474,864	2,337,133
--	Multiple codes 20–39*	24,816,626	7,201,300	291	2,204,078	34,222,296	1,079,749	7,299,661	8,379,410
30	Rubber and Plastics Products	35,898,917	8,180	0	302,752	36,213,494	1,067,599	3,500,502	4,568,100
37	Transportation Equipment	32,482,361	195,435	4,546	183,660	32,872,016	933,148	4,501,002	5,434,150
29	Petroleum and Coal Products	23,004,117	7,789,025	1,444,241	273,175	32,524,858	1,143,245	846,352	1,989,597
34	Fabricated Metals Products	14,928,301	829,785	0	191,290	15,966,411	1,255,641	9,482,332	10,737,973
24	Lumber and Wood Products	18,047,532	2,997	0	417,251	18,469,729	99,112	472,897	572,008
32	Stone/Clay/Glass Products	13,209,940	55,953	2,692	1,597,143	14,868,961	231,512	2,258,782	2,490,294
27	Printing and Publishing	8,785,615	114	0	3,435	8,789,238	91,196	42,962	134,159
36	Electronic/Electrical Equipment	4,383,229	1,433,336	0	117,151	5,934,567	330,363	2,495,252	2,825,615
35	Industrial Machinery	2,815,120	11,091	0	130,859	2,962,824	139,889	2,930,878	3,070,767
39	Misc. Manufacturing Industries	3,313,061	13,802	0	26,233	3,360,635	136,244	1,442,288	1,578,532
25	Furniture and Fixtures	4,370,114	21	0	7,695	4,379,380	9,439	39,938	49,377
38	Measurement/Photographic Instruments	2,883,993	411,381	0	19,043	3,314,438	28,155	124,500	152,655
12	Coal Mining	32,307	7,968	26,317	3,040,996	3,107,588	0	2,432	2,432
22	Textile Mill Products	2,743,800	21,414	0	55,409	2,820,829	50,688	193,449	244,137
5171	Petroleum Bulk Terminals	1,488,568	139,635	0	86,455	1,715,757	105,961	6,406	112,367
31	Leather Products	241,064	53,769	0	3,270	298,103	764	508,151	508,914
5169	Chemical Wholesalers	444,534	106	0	956	448,848	84,928	9,374	94,302
21	Tobacco Products	323,849	135,429	0	0	459,601	365	2,879	3,244
23	Apparel and Other Textile Products	160,228	2	0	23	160,253	7,701	15,086	22,787
	Total	**752,310,204**	**106,556,614**	**80,719,282**	**334,153,615**	**1,273,863,312**	**24,716,457**	**244,704,667**	**269,421,125**

Note: Canada and US data only. Mexico data not available for 2002.
* Multiple SIC codes reported only in TRI.

Table 5–3. (*continued*)

Total Releases: Total Reported Releases On- and Off-site kg	Rank	Adjustment Component* (kg)	Total Releases (adjusted)** (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 50% of total reported amounts)
418,176,912	1	60,802	418,116,109	Hydrochloric acid (air)
386,163,737	2	30,675,913	355,487,825	Zinc and compounds (transfers of metals to disposal), Copper and compounds (land)
220,546,139	3	4,585,317	215,960,823	Nitric acid and nitrate compounds (water, transfers to sewage), Manganese and compounds (land), Methanol, Ethylene, Carbon disulfide (air), Acetonitrile (UIJ)
103,711,664	4	46,274	103,665,390	Methanol (air)
89,028,288	5	3,445,785	85,582,502	Zinc/Lead and compounds (land)
59,797,052	6	1,034	59,796,018	Nitric acid and nitrate compounds (water)
42,601,706	7	632,881	41,968,825	Nitric acid and nitrate compounds (water), Methanol (air), Lead and compounds (transfers of metals to disposal), Hydrochloric acid, Toluene, Methyl ethyl ketone (air)
40,781,594	8	13,513	40,768,081	Styrene, Toluene, Carbon disulfide (air)
38,306,165	9	239,368	38,066,798	Xylenes, Styrene, n-Butyl alcohol, Toluene (air)
34,514,454	10	226,299	34,288,156	Nitric acid and nitrate compounds (water), Sulfuric acid, Toluene, Xylenes (air)
26,704,384	11	646,113	26,058,270	Zinc and compounds (transfers of metals to disposal), n-Butyl alcohol, Xylenes (air), Chromium and compounds (transfers of metals to disposal)
19,041,737	12	26,379	19,015,358	Methanol, Formaldehyde (air)
17,359,256	13	216,489	17,142,767	Hydrochloric acid, Hydrogen fluoride, Sulfuric acid (air), Lead and compounds (transfers of metals to disposal)
8,923,397	14	808	8,922,589	Toluene (air)
8,760,182	15	120,346	8,639,836	Nitric acid and nitrate compounds (water), 1,1-Dichloro-1-fluoroethane (HCFC-141b) (air), Zinc/Lead and compounds (transfers of metals to disposal), Xylenes (air)
6,033,591	16	44,560	5,989,031	Chromium and compounds (transfers of metals to disposal), Xylenes (air), Copper and compounds, Aluminum (transfers of metals to disposal), Chlorodifluoromethane (air)
4,939,167	17	23,185	4,915,981	Zinc and compounds (transfers of metals to disposal), Toluene, Methyl ethyl ketone, Styrene (air)
4,428,757	18	7,857	4,420,901	Toluene, Xylenes (air)
3,467,093	19	1,609	3,465,484	Hydrochloric acid, 1,1-Dichloro-1-fluoroethane (HCFC-141b), Dichloromethane (air), Nitric acid and nitrate compounds (water)
3,110,020	20	2	3,110,018	Manganese and compounds, Lead and compounds (land)
3,064,966	21	154	3,064,811	Methyl ethyl ketone, Toluene, Methanol (air)
1,828,124	22	1,888	1,826,236	Methyl tert-butyl ether, Toluene, n-Hexane (air)
807,017	23	0	807,017	Chromium/Manganese and compounds (transfers of metals to disposal)
543,150	24	11,822	531,328	Methanol, Methyl ethyl ketone, Toluene, Chlorodifluoromethane (air)
462,845	25	0	462,845	Hydrochloric acid (air)
183,040	26	0	183,040	N-Methyl-2-pyrrolidone, Toluene (air)
1,543,284,437		**41,028,398**	**1,502,256,039**	

UIJ = underground injection.

* Off-site releases also reported as on-site releases by another NPRI or TRI facility. This amount is subtracted from total reported releases on- and off-site to get total releases (adjusted).

** Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

- For all of the top three industries—electric utilities, primary metals, and chemicals—TRI facilities accounted for at least 92 percent of total releases.
- For the paper products industry, NPRI facilities accounted for 29 percent of total releases, while TRI facilities accounted for 71 percent, much lower than the TRI average of 90 percent for all sectors.
- Other NPRI industry sectors that accounted for more than one-quarter of total North American releases for the sector were lumber and wood products, furniture and fixtures, and miscellaneous manufacturing industries.

Query Builder

http://www.cec.org/takingstock/

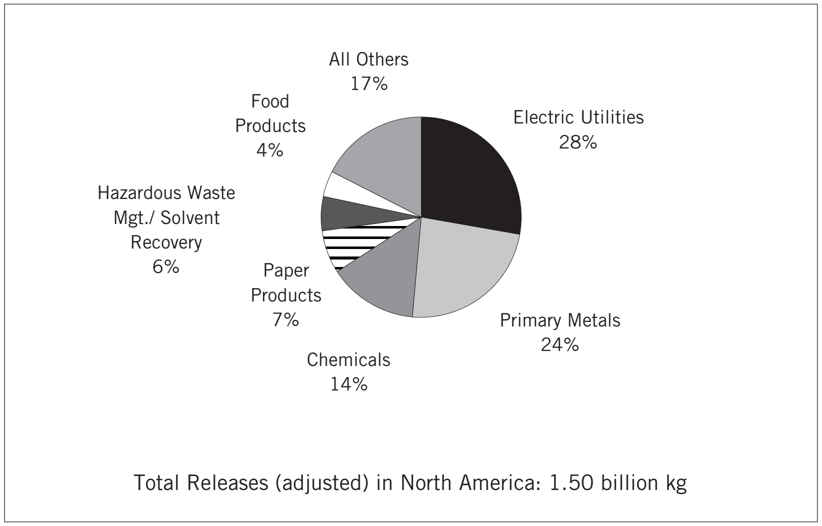
To find the chemicals with the largest releases on- and off-site for the electric utility sector using *Taking Stock Online*:

1. select **Chemical** report.
2. select the **year 2002**.
3. select **Canada & USA** for the geographic area,
   select **All chemicals** for the chemical,
   select **Electric Utilities** for the industrial sector.
4. select **Total releases (on- and off-site)**.

Then click on ✓ Run the query

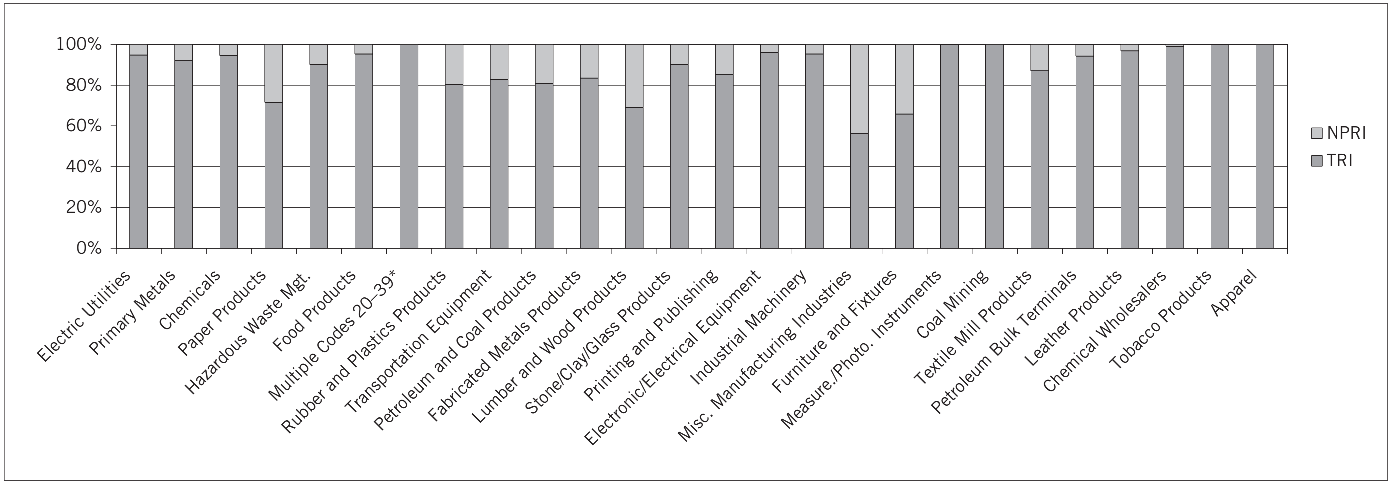
Once you have the report, go to the column titled "Total releases (on- and off-site)" and click on the **down arrow** to sort the list in descending order.

Figure 5–2. Contribution of Top Industry Sectors to Total Releases (adjusted) in North America, 2002



Note: Canada and US data only. Mexico data not available for 2002. Total releases do not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

Figure 5–3. NPRI and TRI as Percentage of North American Total Releases (adjusted), by Industry, 2002 (Ordered by Total North American Releases)



Note: Canada and US data only. Mexico data not available for 2002. Total releases do not include off-site releases also reported as on-site releases by another NPRI or TRI facility.
* Multiple SIC codes reported only in TRI.

Table 5–4. Average Releases per Facility, NPRI and TRI, 2002

	NPRI*		TRI		
	Number	Forms/Facility	Number	Forms/Facility	
Total Facilities	2,257		21,935		
Total Forms	8,243	3.7	76,411	3.5	
Releases On- and Off-site	**kg**	**kg/facility**	**kg**	**kg/facility**	**Ratio of Average per Facility (NPRI/TRI)**
On-site Releases	**116,679,060**	**51,697**	**1,157,184,252**	**52,755**	**1.0**
Air	92,691,779	41,069	659,618,425	30,072	1.4
Surface Water	6,301,432	2,792	100,255,181	4,571	0.6
Underground Injection	1,127,288	499	79,591,993	3,629	0.1
Land	16,434,963	7,282	317,718,652	14,485	0.5
Off-site Releases	**30,299,918**	**13,425**	**239,121,207**	**10,901**	**1.2**
Transfers to Disposal (except metals)	4,026,907	1,784	20,689,550	943	1.9
Transfers of Metals**	26,273,011	11,641	218,431,656	9,958	1.2
Total Reported Releases On- and Off-site	**146,978,978**	**65,121**	**1,396,305,459**	**63,657**	**1.0**
Off-site Releases Omitted for Adjustment Analysis***	3,780,286	1,675	37,248,112	1,698	
Total Releases On- and Off-site (adjusted)****	**143,198,692**	**63,446**	**1,359,057,347**	**61,958**	**1.0**

* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

** Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

*** Off-site releases also reported as on-site releases by another NPRI or TRI facility. This amount is subtracted from total reported releases on- and off-site to get total releases on- and off-site (adjusted).

**** Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

5.2.3 Releases On- and Off-site by Facility, 2002

Average Releases per Facility, NPRI and TRI

- Average on-site releases were about the same for NPRI and TRI, with NPRI about 2 percent lower (51,697 kg per facility) than TRI (52,755 kg per facility). Among on-site releases, the NPRI per-facility average for air releases was higher by more than one-third. The NPRI averages for surface water releases, underground injections, and land releases were lower than in TRI.
- Average reported off-site releases were 23 percent higher for NPRI (13,425 kg per facility) than for TRI (10,901 kg per facility).
- Average total on- and off-site releases were about the same for NPRI and TRI, with NPRI about 2 percent higher (65,121 kg per facility) than for TRI (63,657 kg per facility).

Facilities with Largest Total Reported Releases

A small number of facilities accounted for a large percentage of total releases in North America. Fifty facilities in North America, representing only 0.2 percent of all reporting facilities, accounted for almost one-third (31 percent) of total reported releases on- and off-site in 2002.

- The 50 facilities with the largest total releases in North America reported 471.9 million kg in 2002. They accounted for 61 percent of all on-site land releases and 65 percent of all on-site underground injection.
- The electric utility industry, the sector with the largest total releases in North America for 2002, had 19 of the 50 facilities with the largest total releases. Eighteen of the 19 plants were in the United States, and one was in Ontario. Hydrochloric acid was the main chemical released. (Only air emissions of this chemical are included in the matched data set.)
- The primary metals industry, the sector with the second-largest total releases, had 15 facilities among the top 50 facilities, including eight of the top 10. The facility with the largest total releases was BHP Copper N.A. San Manuel Ops. in San Manuel, Arizona, a primary metals facility that reported large on-site land releases of copper and manganese and their compounds. The facility reported that it had a one-time amount of on-site land disposal due to discontinued operations related to mining. The ASARCO Ray Complex/Hayden Smelter and Concentrator in Hayden, Arizona, also a primary metals facility, reported the second-largest total releases, mainly on-site land releases of copper and zinc and their compounds.
- The third-ranked industry sector, chemical manufacturing, had 10 facilities in the top 50.

Table 5–5. The 50 North American Facilities with the Largest Total Reported Amounts of Releases On- and Off-site, 2002

			SIC Codes			On-site Releases				
Rank	Facility	City, State/Province	Canada	US	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	BHP Copper N.A. San Manuel Ops.	San Manuel, AZ		33	7	5,222	342	988,702	110,230,355	111,224,621
2	ASARCO Inc. Ray Complex Hayden Smelter & Concentrator, Americas Mining Corp.	Hayden, AZ		33	12	73,705	0	0	15,513,029	15,586,734
3	US Ecology Idaho Inc., American Ecology Corp.	Grand View, ID		495/738	15	3,349	0	0	12,685,366	12,688,715
4	National Steel Corp. Greatlakes Ops.	Ecorse, MI		33	23	95,722	28,295	0	0	124,017
5	Nucor Steel, Nucor Corp.	Crawfordsville, IN		33	11	17,434	195	0	0	17,629
6	Zinc Corp. of America Monaca Smelter, Horsehead Inds.	Monaca, PA		33	12	437,196	473	0	0	437,669
7	Solutia Inc.	Cantonment, FL		28	22	88,561	1,009	11,321,740	0	11,411,311
8	Steel Dynamics Inc.	Butler, IN		33	16	275,571	0	0	0	275,571
9	AK Steel Corp. (Rockport Works)	Rockport, IN		33	8	917	10,290,245	0	0	10,291,162
10	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	17	45,252	2,646	0	10,048,148	10,096,046
11	Georgia Power Bowen Steam Electric Generating Plant, Southern Co.	Cartersville, GA		491/493	14	9,272,966	6,974	0	480,696	9,760,636
12	Peoria Disposal Co. 1, Coulter Cos. Inc.	Peoria, IL		495/738	7	1,011	0	0	9,286,257	9,287,268
13	American Electric Power, Amos Plant	Winfield, WV		491/493	13	8,054,678	1,248	0	288,627	8,344,553
14	Lenzing Fibers Corp.	Lowland, TN		28	10	8,221,878	1,861	0	193,334	8,417,073
15	BASF Corp.	Freeport, TX		28	27	93,986	7,230,850	832,621	0	8,157,457
16	Rouge Steel Co., Rouge Inds. Inc.	Dearborn, MI		33	11	31,641	1,932	0	0	33,573
17	Ontario Power Generation Inc, Nanticoke Generating Station	Nanticoke, ON	49	491/493	15	7,489,368	10,386	0	483,379	7,983,133
18	US TVA Johnsonville Fossil Plant	New Johnsonville, TN		491/493	14	7,320,795	4,535	0	476,744	7,802,074
19	Nucor Steel, Nucor Corp.	Huger, SC		33	9	22,839	107	0	0	22,946
20	Reliant Energy Keystone Power Plant	Shelocta, PA		491/493	12	7,344,660	6,040	0	337,582	7,688,282
21	Solutia - Chocolate Bayou	Alvin, TX		28	25	65,037	2,553	7,551,962	54,783	7,674,336
22	Georgia Power, Scherer Steam Electric Generating Plant	Juliette, GA		491/493	14	6,902,372	10,039	0	544,090	7,456,500
23	Vickery Environmental Inc., Waste Management of Ohio	Vickery, OH		495/738	22	0	0	7,109,740	0	7,109,740
24	Doe Run Co. Herculaneum Smelter, Renco Group Inc.	Herculaneum, MO		33	8	59,744	47	0	6,995,210	7,055,001
25	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738	9	839	0	0	7,010,431	7,011,270
26	US Magnesium L.L.C., Renco Group Inc.	Rowley, UT		33	4	6,695,692	0	0	4,100	6,699,791
27	Duke Energy, Belews Creek Steam Station	Belews Creek, NC		491/493	12	6,205,732	867	0	417,111	6,623,710
28	W. H. Sammis Plant, FirstEnergy Corp.	Stratton, OH		491/493	13	5,958,223	690	0	803	5,959,716
29	BP Chemicals Green Lake Facility, BP America Inc.	Port Lavaca, TX		28	20	24,492	268	6,110,183	0	6,134,942
30	USS Gary Works, U.S. Steel Corp.	Gary, IN		33	38	354,306	1,341,243	0	4,004,816	5,700,365
31	CP&L Roxboro Steam Electric Plant, Progress Energy	Semora, NC		491/493	13	5,512,275	2,252	0	456,030	5,970,558
32	Clean Harbors Canada Inc., Lambton Facility	Corunna, ON	49	495/738	15	155	0	0	5,970,088	5,970,243
33	DuPont Delisle Plant	Pass Christian, MS		28	16	293,715	334	5,252,059	420,357	5,966,464
34	Duke Energy Marshall Steam Station	Terrell, NC		491/493	12	5,202,553	2,640	0	647,158	5,852,350
35	J. M. Stuart Station, Dayton Power & Light Co.	Manchester, OH		491/493	13	4,728,452	4,820	0	900,988	5,634,260
36	Progress Energy Crystal River Energy Complex	Crystal River, FL		491/493	15	5,413,024	5,079	0	79,179	5,497,282
37	American Electric Power Mitchell Plant	Moundsville, WV		491/493	14	4,901,159	3,620	0	378,866	5,283,644
38	BP Chemicals Inc., BP America Inc.	Lima, OH		28	31	67,519	0	5,197,097	0	5,264,616
39	Chemical Waste Management Inc., Waste Management Inc.	Kettleman City, CA		495/738	24	2,136	0	0	4,944,071	4,946,207
40	Brandon Shores & Wagner Complex, Constellation Energy Group	Baltimore, MD		491/493	15	4,897,791	1,330	0	0	4,899,121
41	Tampa Electric Co. Gannon Station, TECO Energy Inc.	Tampa, FL		491/493	12	4,841,424	2,635	0	17	4,844,076
42	Nucor Steel Nebraska, Nucor Corp.	Norfolk, NE		33	8	18,223	165	0	138	18,526
43	DuPont Johnsonville Plant	New Johnsonville, TN		28	14	27,857	4,752	0	4,711,755	4,744,364
44	Gulf Power Co. Plant Crist, Southern Co.	Pensacola, FL		491/493	12	4,596,344	969	0	43,567	4,640,880
45	Detroit Edison Monroe Power Plant, DTE Energy	Monroe, MI		491/493	13	3,899,468	6,102	0	542,938	4,448,508
46	DuPont Victoria Plant	Victoria, TX		28	35	151,903	223,257	4,027,614	5,194	4,407,968
47	Sanders Lead Co. Inc.	Troy, AL		33	3	3,483	1,605	0	4,335,615	4,340,703
48	Gibson Generating Station, Cinergy Corp.	Princeton, IN		491/493	13	3,066,186	0	0	1,248,973	4,315,159
49	DuPont Beaumont Plant	Beaumont, TX		28	30	44,151	601	4,210,431	0	4,255,183
50	An Electric Power Muskingum River Plant, American Electric Power	Beverly, OH		491/493	13	3,913,927	3,112	0	303,551	4,220,590
	Subtotal				**761**	**126,744,930**	**19,206,117**	**52,602,149**	**204,043,348**	**402,596,544**
	% of Total				**1**	**17**	**18**	**65**	**61**	**32**
	Total				**84,654**	**752,310,204**	**106,556,614**	**80,719,282**	**334,153,615**	**1,273,863,312**

Note: Canada and US only. Mexico data not available for 2002. The data are estimates of releases and transfers of chemicals as reported by facilities and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.

Table 5–5. (*continued*)

Rank	Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total reported releases from the facility)
1	0	1,043	1,043	111,225,664	Copper/Manganese and compounds (land)
2	0	1,303	1,303	15,588,037	Copper/Zinc and compounds (land)
3	0	0	0	12,688,715	Zinc and compounds (land)
4	2,015	12,490,658	12,492,672	12,616,689	Zinc and compounds (transfers of metals)
5	8,397	12,367,543	12,375,940	12,393,569	Zinc and compounds (transfers of metals)
6	0	11,731,187	11,731,187	12,168,856	Zinc and compounds (transfers of metals)
7	1,528	34	1,562	11,412,873	Nitric acid and nitrate compounds (UIJ)
8	53	10,420,459	10,420,512	10,696,082	Zinc and compounds (transfers of metals)
9	0	223,265	223,265	10,514,427	Nitric acid and nitrate compounds (water)
10	0	4,339	4,339	10,100,384	Copper/Zinc and compounds (land)
11	0	2	2	9,760,638	Hydrochloric acid (air)
12	0	5	5	9,287,273	Zinc and compounds (land)
13	0	434,273	434,273	8,778,826	Hydrochloric acid (air)
14	0	0	0	8,417,073	Carbon disulfide (air)
15	14,014	5,219	19,233	8,176,690	Nitric acid and nitrate compounds (water)
16	0	8,095,377	8,095,377	8,128,950	Zinc and compounds (transfers of metals)
17	0	0	0	7,983,133	Hydrochloric acid (air)
18	0	5,422	5,422	7,807,496	Hydrochloric acid (air)
19	0	7,743,059	7,743,059	7,766,005	Zinc and compounds (transfers of metals)
20	0	2	2	7,688,284	Hydrochloric acid (air)
21	282	0	282	7,674,618	Acrylonitrile, Acrylic acid (UIJ)
22	0	0	0	7,456,500	Hydrochloric acid (air)
23	17,572	533	18,105	7,127,845	Nitric acid and nitrate compounds, Hydrogen fluoride (UIJ)
24	0	17,465	17,465	7,072,467	Zinc and compounds, Aluminum (land)
25	0	1,957	1,957	7,013,227	Zinc/Manganese and compounds (land)
26	0	0	0	6,699,792	Chlorine (air)
27	0	3	3	6,623,714	Hydrochloric acid (air)
28	0	589,510	589,510	6,549,226	Hydrochloric acid (air)
29	0	3,498	3,498	6,138,440	Acetonitrile, Acrylamide, Cyanide and compounds (UIJ)
30	1,406	293,471	294,878	5,995,243	Zinc/Manganese and compounds (land), Nitric acid and nitrate compounds (water)
31	0	23	23	5,970,581	Hydrochloric acid (air)
32	0	0	0	5,970,243	Zinc/Lead/Manganese and compounds (land)
33	0	12	12	5,966,476	Manganese and compounds (UIJ)
34	0	1	1	5,852,352	Hydrochloric acid (air)
35	0	5	5	5,634,265	Hydrochloric acid, Sulfuric acid (air)
36	0	14	14	5,497,295	Hydrochloric acid (air)
37	0	78	78	5,283,722	Hydrochloric acid (air)
38	331	470	801	5,265,417	Acetonitrile, Acrylamide (UIJ)
39	94	2,501	2,595	4,948,801	Lead/Zinc, Asbestos, Aluminum, Aluminum oxide (land)
40	0	120	120	4,899,241	Hydrochloric acid (air)
41	0	0	0	4,844,076	Hydrochloric acid (air)
42	0	4,811,037	4,811,037	4,829,563	Zinc and compounds (transfers of metals)
43	0	0	0	4,744,364	Manganese and compounds (land)
44	0	0	0	4,640,880	Hydrochloric acid (air)
45	0	13	13	4,448,521	Hydrochloric acid (air)
46	28	9,746	9,774	4,417,741	Nitric acid and nitrate compounds (UIJ)
47	0	473	473	4,341,176	Lead and compounds, Aluminum (land)
48	0	1	1	4,315,160	Hydrochloric acid, Sulfuric acid (air), Zinc and compounds (land)
49	5	13,766	13,772	4,268,955	Nitric acid and nitrate compounds, Acetonitrile (UIJ)
50	0	98	98	4,220,688	Hydrochloric acid (air)
	45,724	**69,267,985**	**69,313,709**	**471,910,253**	
	0.2	**28**	**26**	**31**	
	24,775,992	**244,645,133**	**269,421,125**	**1,543,284,437**	

UIJ = underground injection.

- While the fourth-ranked industry sector, paper products, did not have any facilities in the top 50, the fifth-ranked industry sector, hazardous waste management and solvent recovery, had six facilities in the top 50. They included the facility with the third-largest total releases, US Ecology Idaho Inc. in Grand View, Idaho, which reported mainly on-site land releases of zinc and their compounds. Hazardous waste disposal/solvent recovery facilities are disposal sites that receive wastes from manufacturing and other facilities. They may also treat or consolidate wastes and transfer them to other disposal sites.

6

Total Reported Amounts of Releases and Transfers, 1998–2002

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Key Findings

- Total North American releases and transfers declined from 3.14 billion kg in 1998 to 2.92 billion kg in 2002. This was a reduction of 7 percent. Total releases decreased by 11 percent and other off-site transfers for further management decreased by 7 percent, while transfers to recycling increased by 1 percent. However, from 2001 to 2002, total releases and transfers increased by 3 percent, including increases in on-site land releases, transfers to recycling and other transfers for further waste management.
- The pattern of the releases and transfers from 1998 to 2002 differed between NPRI and TRI. Some of the opposite trends were total amounts of releases and transfers as reported to NPRI increased by 7 percent, while in TRI they decreased by 8 percent. On-site releases in NPRI increased by 5 percent while those in TRI decreased by 14 percent. Transfers to recycling increased by 32 percent in NPRI and decreased by 4 percent in TRI. Other transfers for further management increased by 9 percent in NPRI and decreased by 8 percent in TRI. On the other hand, off-site releases in NPRI decreased by 45 percent while those in TRI increased by 5 percent.
- NPRI had an increase of 41 percent in the number of facilities reporting, compared to a decrease of 10 percent in the number of TRI facilities. The increase in the number of facilities, as well as a few facilities reporting large increases, changed the pattern of some trends for NPRI facilities. Overall, total releases and transfers increased (by 7 percent), but among those reporting in both years, and without a few facilities reporting large increases, the total decreased (by 3 percent). The decrease in facilities reporting had little effect on the pattern for TRI.
- Newly reporting facilities affected the overall NPRI reporting for on-site releases. While NPRI reported an overall increase in on-site releases, NPRI facilities reporting in both years showed a decrease. The difference was primarily in on-site land releases, which showed a decrease of 17 percent among the group of facilities reporting in both years and almost no change for all NPRI facilities in the matched dataset. Also, on-site air emissions showed a smaller increase for those reporting in both years.
- The two jurisdictions with the highest total releases and transfers in 2002 were the state of Texas, despite a decrease of 6 percent, and the province of Ontario, with an increase of 5 percent. The state of Ohio had the third-largest total releases and transfers in 2002, with a decrease of 28 percent. Arizona had the largest total releases on- and off-site, primarily due to a large increase reported by one facility (the primary metals facility, BHP Copper in San Manuel, Arizona). Without reporting by this one facility, Arizona would have ranked 27th for total releases and Ohio would have ranked number one for total releases.
- The industry sectors with the largest total releases and transfers were the primary metals sector, with a 7-percent increase (although without the large increase reported by one facility, it would have shown an 11-percent decrease); chemical manufacturing, with a 6-percent decrease; and electric utilities, with an 8-percent decrease.
- While overall releases and transfers in NPRI and TRI are dominated by a few facilities reporting the largest amounts, more than 45 percent of facilities reported smaller amounts (total releases and transfers of 10,000 kg or less in 1998). Among facilities reporting in both 1998 and 2002, total releases and transfers from facilities reporting the smaller amounts increased by more than 300 percent. Indeed, these facilities reported substantial increases in most types of releases and transfers in both NPRI and TRI.
- While the amount reported is not necessarily dependent on the size of the facility, a look at NPRI facilities, which report the number of employees, suggests that the smaller reporters do tend to have fewer employees. Over 58 percent of facilities with fewer than 100 employees were the smaller reporters (those with 10,000 kg or less in 1998) while 55 percent of facilities with more than 1,000 employees were larger reporters (those with 100,000 kg to 1,000,000 kg in 1998).
- While facilities falling into the group of smaller reporters (facilities reporting 10,000 kg or less in 1998) accounted for about the same percentage of all facilities reporting in both 1998 and 2002 in NPRI and TRI (39 percent for NPRI and 46 percent for TRI), the reporting on releases by industry sectors was different. In NPRI, the paper industry represented 39 percent of total releases from this group of smaller reporters in 2002, and in TRI, the food industry had the largest total releases, representing 21 percent of total releases for the group in 2002.

6.1 Introduction

This chapter examines changes in reported amounts of North American releases and transfers from 1998 to 2002, including on- and off-site releases, transfers to recycling, and other transfers for further management. It analyzes data for industries and chemicals that reported in both the United States and Canada (the matched data set) for the years 1998 and 2002. Data for manufacturing sectors as well as electrical utilities, hazardous waste management facilities, chemical wholesalers and coal mining are included. Comparable Mexican data are not available for these years. The chapter analyzes the effect on the data of newly reporting facilities (facilities that reported in 2002 but not in 1998) as well as those facilities that have stopped reporting. This chapter also takes a special look at the group of facilities that reported relatively smaller amounts, i.e., less than 10,000 kg of total releases and transfers in 1998, as compared to those that reported larger amounts.

The information in this chapter is based on the 153 chemicals that were consistently reported from 1998 to 2002. This chapter does not include the new chemicals added to NPRI for the 1999 and 2000 reporting years because data for these chemicals are not available for 1998. Nor does it include mercury and its compounds because the threshold for that chemical was lowered for both NPRI and TRI beginning with the 2000 reporting year. Lead and its compounds are not included because TRI lowered the threshold for reporting for the 2001 reporting year (NPRI lowered the threshold for the 2002 reporting year). The 2002 data presented in this chapter are, therefore, a subset of the 2002 data presented in **Chapters 4** and **5**.

Further details of facilities' reporting and their changes can be found by using the "query builder" function on the *Taking Stock Online* web site <http://www.cec.org/takingstock>.

6.2 1998–2002 Total Reported Amounts of Releases and Transfers in North America

Total reported amounts of releases and transfers include the following categories: **on-site releases** (releases to air, water, underground injection, and land at the site of the facility), **off-site releases** (transfers to disposal (except metals) and transfers of metals off the facility site to disposal, sewage, treatment, or energy recovery), **transfers to recycling**, and **other transfers for further management** (transfers to energy recovery, treatment, and sewage, not including such transfers of metals). The term **total reported amounts of releases and transfers** refers to the sum of these four groups.

In addition, some facilities report transfers to disposal that are in turn reported by other NPRI or TRI facilities as on-site releases. **Total releases (adjusted)** are total releases on- and off-site adjusted so that the chemical amounts are included only once. (See **Chapter 2** for a further explanation of the categories used in this report.) Note that **total reported amounts of releases and transfers** includes total releases before the adjustment in order to focus on how the total amounts reported by facilities are managed.

- Total reported amounts of releases and transfers declined from 3.14 billion kg to 2.92 billion kg, or 7 percent, from 1998 to 2002. From 2001 to 2002, however, total reported amounts increased 3 percent.
- North American on-site releases decreased by 13 percent, mainly due to decreased emissions to air of almost 161 million kg (18 percent). Releases to underground injection decreased by over 12 million kg (15 percent) and releases to water decreased by over 9 million kg (8 percent). On the other hand, releases to land (mainly landfills) increased by over 12 million kg (4 percent). From 2001 to 2002, on-site releases increased by 8 percent, due to increases in on-site land releases and underground injection.

Table 6–1. Summary of Total Reported Amounts of Releases and Transfers in North America, 1998–2002

	North America						
	1998	1999	2000	2001	2002	Change 1998–2002	
	Number	Number	Number	Number	Number	Number	%
Total Facilities	21,732	21,532	21,563	20,947	20,366	-1,366	-6
Total Forms	69,629	69,310	69,418	66,963	65,516	-4,113	-6
Releases On- and Off-site	**kg**	**kg**	**kg**	**kg**		**kg**	**%**
On-site Releases	**1,351,465,046**	**1,349,617,609**	**1,292,643,348**	**1,095,126,406**	**1,181,075,610**	**-170,389,436**	**-13**
Air	871,581,596	863,014,757	818,555,912	712,545,798	710,691,994	-160,889,601	-18
Surface Water	113,838,042	122,210,277	121,784,693	104,766,530	104,655,330	-9,182,712	-8
Underground Injection	85,193,714	80,199,557	88,498,209	70,603,906	72,714,088	-12,479,626	-15
Land	280,729,318	284,068,580	263,697,285	207,104,485	292,899,336	12,170,018	4
Off-site Releases	**253,188,752**	**275,047,832**	**252,514,162**	**254,468,004**	**240,743,322**	**-12,445,430**	**-5**
Transfers to Disposal (except metals)	32,879,321	39,322,267	37,092,295	36,770,155	23,046,724	-9,832,597	-30
Transfers of Metals**	220,309,430	235,725,565	215,421,867	217,697,849	217,696,598	-2,612,832	-1
Total Reported Releases On- and Off-site	**1,604,653,798**	**1,624,665,441**	**1,545,157,510**	**1,349,594,410**	**1,421,818,932**	**-182,834,866**	**-11**
Transfers Omitted for Adjustment Analysis***	47,699,729	59,570,693	45,681,981	38,616,533	35,899,582	-11,800,147	--
Total Releases On- and Off-site (adjusted)* **	**1,556,954,069**	**1,565,094,748**	**1,499,475,529**	**1,310,977,877**	**1,385,919,350**	**-171,034,719**	**-11**
Off-site Transfers to Recycling	**880,564,374**	**923,699,128**	**928,192,426**	**867,819,965**	**887,431,786**	**6,867,412**	**1**
Transfers to Recycling of Metals	738,576,883	778,609,263	792,104,104	734,344,374	755,480,296	16,903,413	2
Transfers to Recycling (except metals)	141,987,491	145,089,865	136,088,322	133,475,591	131,951,490	-10,036,002	-7
Other Off-site Transfers for Further Management	**652,710,589**	**583,587,726**	**596,174,455**	**604,857,246**	**608,302,456**	**-44,408,133**	**-7**
Energy Recovery (except metals)	385,548,653	328,909,181	336,575,262	341,607,148	335,714,755	-49,833,898	-13
Treatment (except metals)	130,486,778	119,945,985	115,616,672	115,866,865	121,208,507	-9,278,271	-7
Sewage (except metals)	136,675,159	134,732,560	143,982,521	147,383,233	151,379,195	14,704,036	11
Total Reported Amounts of Releases and Transfers****	**3,137,928,761**	**3,131,952,295**	**3,069,524,391**	**2,822,271,621**	**2,917,553,174**	**-220,375,587**	**-7**

Note: Canada and US data only. Mexico data not available for 1998–2002. Data include 153 chemicals common to both NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data, in combination with other information, can be used as a starting point in evaluating exposures that may result from releases and other management activities which involve these chemicals.

* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

** Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

*** Transfers omitted are those off-site releases also reported as on-site releases by another NPRI or TRI facility.

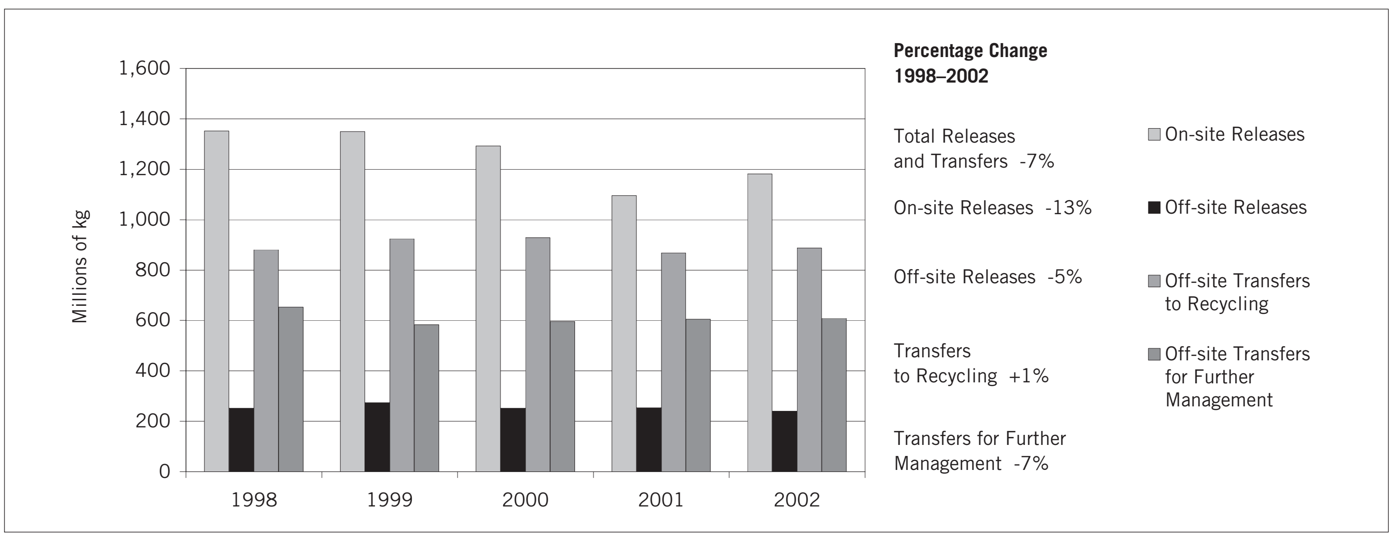
**** Sum of total reported releases on- and off-site, off-site transfers to recycling and other off-site transfers for further management.

- On-site releases in NPRI and TRI showed opposite trends from 1998 to 2002. On-site releases in NPRI rose by 5 percent, with the largest changes being an increase in air emissions of 6.6 million kg (8 percent) and in surface water discharges of 1.5 million kg (32 percent). For NPRI, both underground injection and on-site land decreased although the decrease in on-site land was less than 0.5 percent. For TRI, air emissions decreased by 21 percent, surface water discharges decreased by 10 percent and underground injection decreased by 12 percent, while on-site land increased by 5 percent.
- Transfers to recycling of metals increased (by 36 percent) in NPRI while in TRI there was a relatively small decrease (of 3 percent). Zinc and its compounds had the largest increase in transfers to recycling in North America. Twenty-five facilities reported an increase of more than one million kg in transfers to recycling from 1998 to 2002. The increase totaled 45.5 million kg. These same facilities reported a decrease of 15.9 million kg in transfers to disposal. The decision to change from off-site disposal to recycling may be driven by a number of factors, including pricing, contracts and proximity of the receiving site.
- Off-site releases (transfers to disposal) in North America decreased by 5 percent from 1998 to 2002. Again, NPRI and TRI showed opposite trends. TRI off-site releases rose by 5 percent, or 10.0 million kg, although 2001 to 2002 showed a decrease. NPRI off-site releases, on the other hand, decreased by 45 percent, or 22.5 million kg. However, the decrease was mainly due to a decrease from 1999

Table 6–1. (*continued*)

NPRI*							TRI						
1998	1999	2000	2001	2002	Change 1998–2002		1998	1999	2000	2001	2002	Change 1998–2002	
Number	Number	Number	Number	Number	Number	%	Number	Number	Number	Number	Number	Number	%
1,509	1,633	1,709	1,894	2,121	612	41	20,223	19,899	19,854	19,053	18,245	-1,978	-10
4,908	5,337	5,659	6,229	7,145	2,237	46	64,721	63,973	63,759	60,734	58,371	-6,350	-10
kg	**kg**	**kg**	**kg**	**kg**	**kg**	**%**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**%**
103,667,774	**118,999,878**	**114,349,923**	**108,792,605**	**109,168,413**	**5,500,639**	**5**	**1,247,797,272**	**1,230,617,731**	**1,178,293,425**	**986,333,801**	**1,071,907,197**	**-175,890,076**	**-14**
81,266,339	84,720,246	88,080,086	84,151,332	87,887,637	6,621,298	8	790,315,257	778,294,511	730,475,826	628,394,466	622,804,358	-167,510,899	-21
4,746,860	6,393,563	6,506,410	6,876,997	6,260,123	1,513,263	32	109,091,182	115,816,714	115,278,283	97,889,533	98,395,206	-10,695,976	-10
3,700,389	3,272,461	3,569,261	2,611,456	1,110,807	-2,589,582	-70	81,493,325	76,927,096	84,928,948	67,992,450	71,603,281	-9,890,044	-12
13,831,810	24,489,170	16,086,917	15,047,133	13,794,984	-36,826	-0.3	266,897,508	259,579,410	247,610,368	192,057,352	279,104,352	12,206,843	5
50,369,766	**65,311,209**	**32,000,433**	**27,933,008**	**27,893,834**	**-22,475,932**	**-45**	**202,818,986**	**209,736,623**	**220,513,729**	**226,534,996**	**212,849,488**	**10,030,502**	**5**
9,251,591	9,466,135	5,923,392	5,192,474	3,963,751	-5,287,840	-57	23,627,730	29,856,132	31,168,903	31,577,681	19,082,973	-4,544,757	-19
41,118,175	55,845,074	26,077,041	22,740,534	23,930,083	-17,188,092	-42	179,191,255	179,880,491	189,344,826	194,957,315	193,766,515	14,575,259	8
154,037,540	**184,311,087**	**146,350,356**	**136,725,613**	**137,062,248**	**-16,975,292**	**-11**	**1,450,616,258**	**1,440,354,354**	**1,398,807,154**	**1,212,868,797**	**1,284,756,684**	**-165,859,574**	**-11**
763,731	13,131,624	4,560,013	4,561,594	3,105,396	2,341,665	--	46,935,998	46,439,069	41,121,969	34,054,939	32,794,187	-14,141,811	--
153,273,809	**171,179,463**	**141,790,343**	**132,164,019**	**133,956,852**	**-19,316,957**	**-13**	**1,403,680,260**	**1,393,915,285**	**1,357,685,185**	**1,178,813,858**	**1,251,962,498**	**-151,717,762**	**-11**
108,714,560	**94,702,349**	**107,535,709**	**115,129,651**	**143,272,135**	**34,557,575**	**32**	**771,849,814**	**828,996,779**	**820,656,717**	**752,690,314**	**744,159,651**	**-27,690,163**	**-4**
93,786,957	79,685,247	91,633,794	101,344,082	127,913,758	34,126,801	36	644,789,926	698,924,016	700,470,310	633,000,292	627,566,538	-17,223,387	-3
14,927,603	15,017,102	15,901,915	13,785,569	15,358,377	430,774	3	127,059,888	130,072,763	120,186,407	119,690,022	116,593,113	-10,466,776	-8
28,227,908	**30,235,452**	**33,257,310**	**25,527,893**	**30,776,829**	**2,548,921**	**9**	**624,482,681**	**553,352,274**	**562,917,145**	**579,329,353**	**577,525,627**	**-46,957,054**	**-8**
12,123,551	14,069,929	15,580,763	8,918,306	8,184,370	-3,939,181	-32	373,425,102	314,839,252	320,994,499	332,688,842	327,530,385	-45,894,717	-12
10,741,555	10,769,322	10,603,262	9,377,794	14,440,383	3,698,828	34	119,745,223	109,176,663	105,013,410	106,489,071	106,768,124	-12,977,099	-11
5,362,802	5,396,201	7,073,285	7,231,793	8,152,076	2,789,274	52	131,312,357	129,336,359	136,909,236	140,151,440	143,227,119	11,914,762	9
290,980,008	**309,248,888**	**287,143,375**	**277,383,157**	**311,111,212**	**20,131,204**	**7**	**2,846,948,753**	**2,822,703,407**	**2,782,381,016**	**2,544,888,464**	**2,606,441,963**	**-240,506,791**	**-8**

Figure 6–1. Total Reported Amounts of Releases and Transfers in North America, 1998–2002



Note: Canada and US only. Mexico data not available for 1998–2002.

to 2000. From 2001 to 2002, NPRI disposal of metals increased 5 percent.

- Transfers to recycling increased by 1 percent in North America. NPRI transfers to recycling increased by 32 percent, but TRI recycling decreased by 4 percent. Most materials sent for recycling are metals (89 percent for NPRI and 84 percent for TRI). NPRI recycling of metals increased by 36 percent, including an increase of 26 percent from 2001 to 2002.
- Within other transfers for further management, which fell 7 percent overall, transfers to energy recovery declined by 13 percent, transfers to treatment declined by 7 percent, but transfers to sewage rose by 11 percent. Transfers to sewage increased for both NPRI (52 percent) and TRI (9 percent). NPRI facilities reported increases in transfers to sewage of more than 1 million kg for both methanol and nitric acid and nitrate compounds. The chemical manufacturer Celanese Canada Weston Terminal facility in North York, Ontario, reported an increase of almost 1.4 million kg of methanol transferred to sewage. TRI facilities reported an increase of more than 20 million kg in nitric acid and nitrate compounds transferred to sewage. One chemical manufacturer, Jayhawk Fine Chemicals in Galena, Kansas, was responsible for an increase of over 21 million kg, which they indicated was due to a change in reporting requirements.

6.2.1 1998–2002 Total Reported Amounts of Releases and Transfers by State and Province

- Texas reported the highest North American total releases and transfers in 2002, but the amount fell by 6 percent, from 249.3 million kg to 233.3 million kg. It had ranked second for total releases and transfers in 1998, behind Ohio. Texas reported decreases of 19 percent in total releases, but increases in transfers to recycling (of 6 percent) and in other off-site transfers for further waste management (of 2 percent).
- Ontario ranked second in 2002, up from fourth in 1998, with an increase in total releases and transfers of 5 percent, mainly as a result of a 39-percent increase in recycling. Total releases fell by 24 percent, and other off-site transfers for further management fell by 9 percent.
- Ohio had the third-highest total releases and transfers in 2002 and the highest in 1998. Its reported amount fell by 28 percent. Ohio reported the highest total reported releases on- and off-site in 1998 and the second-highest in 2002, with a 28-percent decrease over the time period.
- Arizona reported the highest releases on- and off-site in 2002 with an increase of 101.6 million kg. One primary metals facility, BHP Copper N.A. San Manuel Ops. in San Manuel, Arizona, reported an increase of 108.9 million kg from 1998 to 2002. The facility reported that it had an increase in on-site land disposal due to discontinued operations related to mining. Without reporting by this one facility, Arizona would have ranked 27th for total releases in 2002.

Table 6–2. Change in Total Reported Amounts of Releases and Transfers in North America, by State and Province, 1998–2002

	Facilities					Total Releases On- and Off-site				
	1998		2002		Change 1998–2002	1998		2002		Change 1998–2002
State/Province	Number	Rank	Number	Rank	(%)	kg	Rank	kg	Rank	(%)
Alabama	480	17	433	18	-10	55,012,031	8	47,428,314	13	-14
Alaska	10	59	8	59	-20	258,033	60	96,460	62	-63
Alberta	130	40	174	34	34	18,172,903	29	14,062,291	30	-23
Arizona	184	33	176	33	-4	25,343,063	22	126,908,050	1	401
Arkansas	351	25	308	25	-12	19,042,887	28	13,135,849	32	-31
British Columbia	78	43	127	40	63	6,362,897	42	14,438,572	29	127
California	1,194	4	1,037	5	-13	17,797,090	30	14,861,181	28	-16
Colorado	157	35	142	38	-10	3,480,350	52	4,094,656	46	18
Connecticut	289	28	257	29	-11	4,120,241	48	2,334,739	52	-43
Delaware	62	46	57	48	-8	6,298,602	44	4,796,173	41	-24
District of Columbia	2	63	5	62	150	30,048	64	27,309	64	-9
Florida	498	16	481	14	-3	53,009,155	10	51,694,210	8	-2
Georgia	655	11	586	11	-11	48,130,018	14	49,803,496	11	3
Guam	2	64	1	64	-50	66,813	63	56,032	63	-16
Hawaii	16	58	17	58	6	815,144	56	1,041,878	56	28
Idaho	52	47	58	47	12	20,773,653	26	16,347,823	27	-21
Illinois	1,178	5	1,018	6	-14	68,787,582	6	49,465,176	12	-28
Indiana	958	6	859	7	-10	77,412,396	5	88,893,806	3	15
Iowa	372	23	347	24	-7	16,851,383	31	13,633,851	31	-19
Kansas	249	31	235	30	-6	13,817,009	33	6,894,020	37	-50
Kentucky	421	21	398	20	-5	38,745,990	16	33,340,624	17	-14
Louisiana	309	26	307	26	-1	51,808,890	12	39,897,141	14	-23
Maine	70	44	68	44	-3	3,702,147	50	3,850,053	47	4
Manitoba	49	49	68	45	39	4,418,062	47	4,235,238	45	-4
Maryland	168	34	143	37	-15	15,859,472	32	18,366,303	23	16
Massachusetts	439	19	383	22	-13	4,543,693	45	2,951,625	49	-35
Michigan	841	7	766	8	-9	51,819,197	11	52,540,033	7	1
Minnesota	436	20	389	21	-11	7,960,872	39	7,483,062	36	-6
Mississippi	280	29	260	28	-7	29,458,986	19	21,684,722	21	-26
Missouri	535	15	461	15	-14	28,492,868	20	23,617,684	19	-17
Montana	27	55	26	57	-4	20,826,480	25	2,604,053	51	-87
Nebraska	145	37	148	36	2	11,371,672	38	17,186,181	25	51
Nevada	47	50	47	49	0	2,900,977	54	2,752,453	50	-5
New Brunswick	29	52	31	54	7	7,767,387	40	6,000,721	39	-23
New Hampshire	101	42	83	43	-18	2,940,708	53	1,881,861	54	-36
New Jersey	537	14	416	19	-23	11,491,675	37	8,548,768	34	-26
New Mexico	51	48	46	50	-10	12,214,781	36	1,539,707	55	-87
New York	612	12	529	13	-14	24,289,380	23	16,670,840	26	-31
Newfoundland and Labrador	7	60	6	60	-14	457,911	59	766,467	57	67
North Carolina	740	10	675	10	-9	60,965,196	7	51,163,334	9	-16
North Dakota	33	51	36	52	9	3,589,917	51	3,408,641	48	-5
Nova Scotia	27	56	39	51	44	4,536,325	46	4,904,355	40	8
Ohio	1,507	1	1,341	1	-11	135,948,444	1	98,102,956	2	-28
Oklahoma	294	27	272	27	-7	12,238,823	35	7,968,076	35	-35
Ontario	804	9	1,176	2	46	88,175,637	4	67,200,168	6	-24
Oregon	240	32	209	32	-13	23,199,820	24	12,587,078	33	-46
Pennsylvania	1,255	2	1,107	4	-12	92,389,907	3	67,417,655	5	-27
Prince Edward Island	3	61	5	61	67	207,653	62	256,187	60	23
Puerto Rico	145	38	113	41	-22	7,460,313	41	4,560,922	42	-39
Quebec	357	24	460	16	29	20,002,427	27	20,871,944	22	4
Rhode Island	117	41	101	42	-14	686,431	57	306,085	58	-55
Saskatchewan	25	57	35	53	40	3,936,338	49	4,326,304	43	10
South Carolina	470	18	449	17	-4	32,323,733	17	33,400,459	16	3
South Dakota	64	45	59	46	-8	1,521,335	55	1,925,001	53	27
Tennessee	589	13	537	12	-9	53,384,498	9	51,078,319	10	-4
Texas	1,207	3	1,152	3	-5	109,775,727	2	88,795,423	4	-19
Utah	133	39	138	39	4	48,140,070	13	23,058,423	20	-52
Vermont	29	53	28	55	-3	209,536	61	128,722	61	-39
Virgin Islands	3	62	3	63	0	502,286	58	265,600	59	-47
Virginia	416	22	366	23	-12	30,696,024	18	29,077,124	18	-5
Washington	260	30	224	31	-14	13,589,003	34	6,876,845	38	-49
West Virginia	155	36	158	35	2	42,053,854	15	36,042,748	15	-14
Wisconsin	809	8	754	9	-7	26,134,517	21	17,884,673	24	-32
Wyoming	29	54	28	56	-3	6,333,536	43	4,280,468	44	-32
Total	**21,732**		**20,366**		**-6**	**1,604,653,798**		**1,421,818,932**		**-11**

Note: Canada and US data only. Mexico data not available for 1998–2002. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings are meant to imply that a facility, state or province is not meeting its legal requirements. The data do not predict levels of exposure of the public to those chemicals. Transfers are from facilities located in the state/province.

Table 6–2. (*continued*)

Total Transfers to Recycling					Total Other Transfers for Further Management					Total Reported Amounts of Releases and Transfers				
1998		2002		Change 1998–2002	1998		2002		Change 1998–2002	1998		2002		Change 1998–2002
kg	Rank	kg	Rank	(%)	kg	Rank	kg	Rank	(%)	kg	Rank	kg	Rank	(%)
19,325,729	16	18,495,339	17	-4	23,861,893	6	9,477,133	19	-60	98,199,654	8	75,400,786	12	-23
12,301	60	152,416	56	1,139	2,312	60	1,145	60	-50	272,646	62	250,021	62	-8
3,052,672	38	5,580,130	34	83	1,476,305	38	3,279,322	33	122	22,701,880	35	22,921,743	34	1
19,424,107	15	6,595,810	32	-66	1,427,802	39	1,109,001	40	-22	46,194,973	24	134,612,861	7	191
17,592,945	20	28,088,084	10	60	7,276,939	22	20,307,095	8	179	43,912,771	25	61,531,028	16	40
474,422	49	911,790	47	92	504,971	44	455,740	45	-10	7,342,290	48	15,806,102	41	115
20,275,047	12	19,333,149	15	-5	20,096,197	9	18,107,825	10	-10	58,168,334	19	52,302,155	21	-10
7,652,412	31	12,101,316	22	58	2,318,777	35	3,654,133	31	58	13,451,539	42	19,850,104	38	48
8,684,186	30	11,037,701	24	27	4,817,938	29	6,516,580	26	35	17,622,366	41	19,889,020	37	13
2,392,278	42	1,857,870	41	-22	1,767,969	37	1,271,258	39	-28	10,458,849	44	7,925,301	43	-24
3,311	61	7,689	61	132	0	--	0	--	--	33,358	64	34,998	64	5
5,769,027	34	4,869,076	35	-16	5,715,279	27	3,291,927	32	-42	64,493,462	16	59,855,213	17	-7
15,488,916	21	15,447,473	18	-0.3	7,679,126	21	7,608,353	20	-1	71,298,060	12	72,859,322	13	2
0	--	0	--	--	0	--	0	--	--	66,813	63	56,032	63	-16
45,360	58	0	--	-100	1,635	61	62	61	-96	862,139	57	1,041,940	57	21
587,961	48	819,177	49	39	392,202	46	359,999	48	-8	21,753,815	38	17,526,999	40	-19
32,208,383	8	41,107,512	7	28	23,386,922	7	21,444,540	6	-8	124,382,887	7	112,017,227	8	-10
64,923,182	3	58,496,523	5	-10	41,472,696	4	14,246,522	15	-66	183,808,274	5	161,636,852	5	-12
10,906,393	25	12,660,273	21	16	6,308,373	25	5,667,870	30	-10	34,066,150	29	31,961,994	27	-6
12,354,371	23	8,456,827	30	-32	2,096,130	36	24,534,249	5	1,070	28,267,510	30	39,885,097	26	41
20,185,738	14	19,415,858	14	-4	11,929,683	15	16,230,577	13	36	70,861,412	14	68,987,059	15	-3
19,307,169	17	13,870,752	20	-28	13,494,352	14	15,496,186	14	15	84,610,411	11	69,264,078	14	-18
957,327	47	1,673,711	43	75	358,245	47	445,860	46	24	5,017,720	52	5,969,624	47	19
2,650,746	41	865,838	48	-67	352,057	48	732,622	42	108	7,420,865	47	5,833,698	48	-21
1,961,472	43	1,882,690	40	-4	4,185,302	32	2,685,035	36	-36	22,006,247	37	22,934,027	33	4
12,023,049	24	10,118,423	25	-16	8,505,588	19	7,417,262	21	-13	25,072,331	32	20,487,309	36	-18
55,922,021	5	42,737,212	6	-24	114,607,054	1	95,864,383	1	-16	222,348,272	3	191,141,628	4	-14
9,315,389	27	9,553,637	27	3	5,487,721	28	5,751,058	28	5	22,763,982	34	22,787,757	35	0
6,378,290	32	7,153,596	31	12	4,562,110	30	2,779,792	35	-39	40,399,386	27	31,618,110	28	-22
17,664,189	18	15,036,731	19	-15	10,239,724	17	10,481,377	18	2	56,396,781	20	49,135,792	22	-13
22,549	59	54,141	57	140	28,557	57	37,393	56	31	20,877,586	39	2,695,587	54	-87
10,650,229	26	8,864,293	28	-17	413,713	45	1,291,040	38	212	22,435,614	36	27,341,514	30	22
1,082,759	46	388,872	52	-64	31,589	56	63,081	55	100	4,015,325	55	3,204,407	53	-20
215,072	55	153,367	55	-29	56,269	55	24,724	58	-56	8,038,728	46	6,178,812	46	-23
5,724,926	35	4,140,869	36	-28	1,380,388	40	463,285	44	-66	10,046,023	45	6,486,016	44	-35
13,174,668	22	9,967,696	26	-24	36,789,434	5	38,716,485	3	5	61,455,777	18	57,232,948	18	-7
56,513	57	928,670	46	1,543	319,438	49	140,172	53	-56	12,590,732	43	2,608,549	55	-79
35,305,776	7	24,805,718	11	-30	8,822,967	18	6,876,567	23	-22	68,418,122	15	48,353,125	23	-29
0	--	0	--	--	0	--	0	--	--	457,911	60	766,467	59	67
27,742,225	9	33,913,708	8	22	8,280,541	20	6,504,606	27	-21	96,987,962	9	91,581,648	9	-6
311,260	52	657,284	50	111	258,747	51	228,929	51	-12	4,159,924	54	4,294,855	52	3
1,442,146	44	1,135,349	44	-21	301,459	50	202,460	52	-33	6,279,930	51	6,242,164	45	-1
75,382,213	2	62,086,112	3	-18	59,191,074	3	35,248,370	4	-40	270,521,732	1	195,437,438	3	-28
9,207,374	29	8,832,921	29	-4	2,448,556	34	1,642,642	37	-33	23,894,753	33	18,443,639	39	-23
82,950,561	1	115,660,015	1	39	20,916,643	8	19,112,298	9	-9	192,042,841	4	201,972,480	2	5
4,754,505	37	3,600,668	38	-24	6,368,383	24	6,782,857	24	7	34,322,708	28	22,970,603	32	-33
55,285,937	6	62,720,237	2	13	16,823,663	11	13,522,573	16	-20	164,499,506	6	143,660,464	6	-13
0	--	10,430	60	--	71,041	54	250,549	50	253	278,694	61	517,166	60	86
6,310,768	33	6,156,069	33	-2	14,160,098	13	17,147,112	11	21	27,931,179	31	27,864,104	29	-0
17,618,139	19	18,504,142	16	5	4,545,208	31	6,640,757	25	46	42,165,774	26	46,016,843	24	9
5,106,041	36	3,490,742	39	-32	856,697	41	872,602	41	2	6,649,170	50	4,669,429	50	-30
310,802	53	451,074	51	45	3,955	59	78,357	54	1,881	4,251,095	53	4,855,735	49	14
20,262,951	13	28,560,582	9	41	18,661,526	10	20,497,506	7	10	71,248,210	13	82,458,546	10	16
314,644	51	187,671	54	-40	642,503	43	364,693	47	-43	2,478,482	56	2,477,366	56	-0
24,228,235	10	24,351,172	12	1	7,189,996	23	5,678,166	29	-21	84,802,730	10	81,107,657	11	-4
55,937,472	4	59,062,894	4	6	83,552,758	2	85,440,813	2	2	249,265,956	2	233,299,130	1	-6
1,148,061	45	987,095	45	-14	653,923	42	575,666	43	-12	49,942,054	23	24,621,185	31	-51
234,344	54	316,257	53	35	158,880	52	324,960	49	105	602,760	59	769,939	58	28
75,073	56	52,656	58	-30	154,971	53	33,512	57	-78	732,331	58	351,769	61	-52
9,209,166	28	11,742,424	23	28	10,686,695	16	12,801,930	17	20	50,591,884	22	53,621,478	20	6
2,846,564	39	3,729,248	37	31	3,108,491	33	3,120,853	34	0	19,544,058	40	13,726,946	42	-30
2,819,208	40	1,852,184	42	-34	6,175,512	26	7,349,206	22	19	51,048,574	21	45,244,138	25	-11
22,821,399	11	21,689,826	13	-5	15,326,805	12	17,046,725	12	11	64,282,720	17	56,621,224	19	-12
474,398	50	50,794	59	-89	4,805	58	4,662	59	-3	6,812,739	49	4,335,924	51	-36
880,564,374		**887,431,786**		**1**	**652,710,589**		**608,302,456**		**-7**	**3,137,928,761**		**2,917,553,174**		**-7**

6.2.2 1998–2002 Total Reported Amounts of Releases and Transfers by Industry

Data comparing 1998 to 2002 include all industry sectors in the matched data set, but only those chemicals reported consistently during that period.

- Primary metals, the industry sector with the largest total releases and transfers in both 1998 and 2002, recorded an increase of 7 percent in total releases and transfers between 1998 and 2002. One primary metals facility, BHP Copper N.A. San Manuel Ops. in San Manuel, Arizona, reported an increase of 108.9 million kg, primarily as on-site land disposal of copper and manganese compounds. The facility reported that it had a one-time amount of on-site land disposal due to discontinued operations related to mining. Without reporting by this one facility, the primary metals sector would have shown a decrease of 11 percent. The metals copper, manganese and zinc and their compounds had the largest increases in total releases and transfers for this sector, while chlorine, chromium and its compounds and nitric acid and nitrate compounds had the largest decreases. Primary metals facilities in NPRI reported an increase of 3 percent, while those in TRI rose by 7 percent.
- The chemical manufacturing sector showed a decrease of 6 percent, primarily in total releases. Transfers for further management increased for the chemical manufacturing sector from 1998 to 2002. The chemicals for this sector with the largest decreases were chromium and its compounds, ethylene glycol and xylenes, while methanol, naphthalene and nitric acid and nitrate compounds had the largest increases in total releases and transfers. Overall, TRI chemical manufacturers' total releases and transfers decreased by 6 percent, while in NPRI they decreased by 10 percent.

Table 6–3. Change in Total Reported Amounts of Releases and Transfers in North America, by Industry, 1998–2002 (Ordered by Total Releases and Transfers, 2002)

		Total Releases On- and Off-site					Total Transfers to Recycling				
		1998		2002		Change 1998–2002	1998		2002		Change 1998–2002
US SIC Code	Industry	kg	Rank	kg	Rank	(%)	kg	Rank	kg	Rank	(%)
33	Primary Metals	329,734,295	2	363,057,755	2	10	339,157,019	1	350,642,996	1	3
28	Chemicals	264,611,716	3	198,215,643	3	-25	72,313,330	3	68,965,081	4	-5
491/493	Electric Utilities	432,980,127	1	397,349,673	1	-8	1,824,298	15	2,976,252	14	63
495/738	Hazardous Waste Mgt./Solvent Recovery	122,456,825	4	73,795,174	5	-40	9,550,787	8	12,271,444	8	28
34	Fabricated Metals Products	33,561,211	10	25,278,259	11	-25	197,189,770	2	191,053,431	2	-3
26	Paper Products	119,308,650	5	102,902,020	4	-14	1,406,242	17	723,692	17	-49
37	Transportation Equipment	47,547,391	8	37,028,698	8	-22	61,947,431	5	77,062,943	3	24
--	Multiple codes 20–39*	48,947,068	7	36,072,603	9	-26	64,945,020	4	58,963,491	5	-9
20	Food Products	30,501,747	11	45,347,115	6	49	1,285,229	18	629,123	18	-51
36	Electronic/Electrical Equipment	11,167,610	15	6,344,644	15	-43	53,935,869	6	42,978,288	6	-20
30	Rubber and Plastics Products	52,066,741	6	37,382,879	7	-28	8,267,278	11	6,285,013	11	-24
35	Industrial Machinery	7,815,580	17	5,334,452	16	-32	34,089,072	7	42,402,709	7	24
29	Petroleum and Coal Products	33,631,097	9	31,883,781	10	-5	8,427,351	10	9,993,012	9	19
32	Stone/Clay/Glass Products	14,240,723	13	15,931,455	13	12	1,530,651	16	1,661,856	16	9
24	Lumber and Wood Products	16,742,582	12	18,789,600	12	12	498,307	21	359,033	19	-28
27	Printing and Publishing	11,175,527	14	8,898,023	14	-20	3,567,073	14	5,753,536	12	61
39	Misc. Manufacturing Industries	5,169,216	19	4,670,967	17	-10	9,293,570	9	8,166,375	10	-12
38	Measurement/Photographic Instruments	4,372,648	20	2,639,287	20	-40	5,017,614	12	4,029,923	13	-20
25	Furniture and Fixtures	8,410,300	16	4,302,887	18	-49	4,285,259	13	2,098,239	15	-51
5169	Chemical Wholesalers	565,398	24	433,813	24	-23	1,141,645	19	33,270	22	-97
22	Textile Mill Products	5,244,092	18	2,809,000	19	-46	719,786	20	307,987	20	-57
12	Coal Mining	2,107,618	21	2,053,036	21	-3	19,834	23	3,605	24	-82
31	Leather Products	1,484,268	22	707,064	22	-52	147,673	22	59,286	21	-60
21	Tobacco Products	621,352	23	459,872	23	-26	0	25	0	25	--
23	Apparel and Other Textile Products	190,016	25	131,233	25	-31	4,266	24	11,202	23	163
	Total	**1,604,653,798**		**1,421,818,932**		**-11**	**880,564,374**		**887,431,786**		**1**

Note: Canada and US data only. Mexico data not available for 1998–2002.
* Multiple SIC codes reported only in TRI.

Figure 6–2. Change in NPRI Total Reported Amounts of Releases and Transfers for Industries with Largest Total Amount, 1998–2002

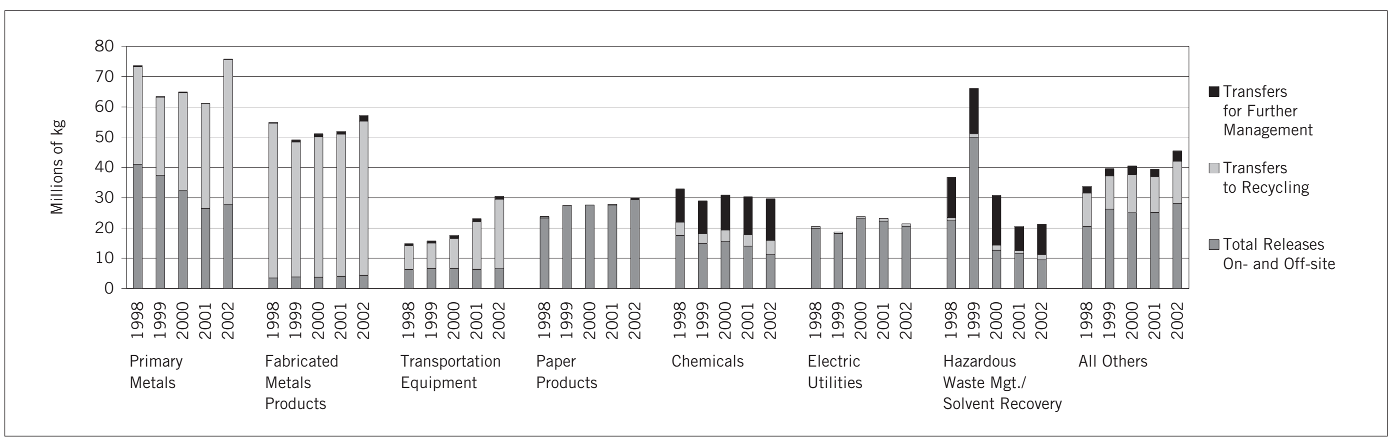
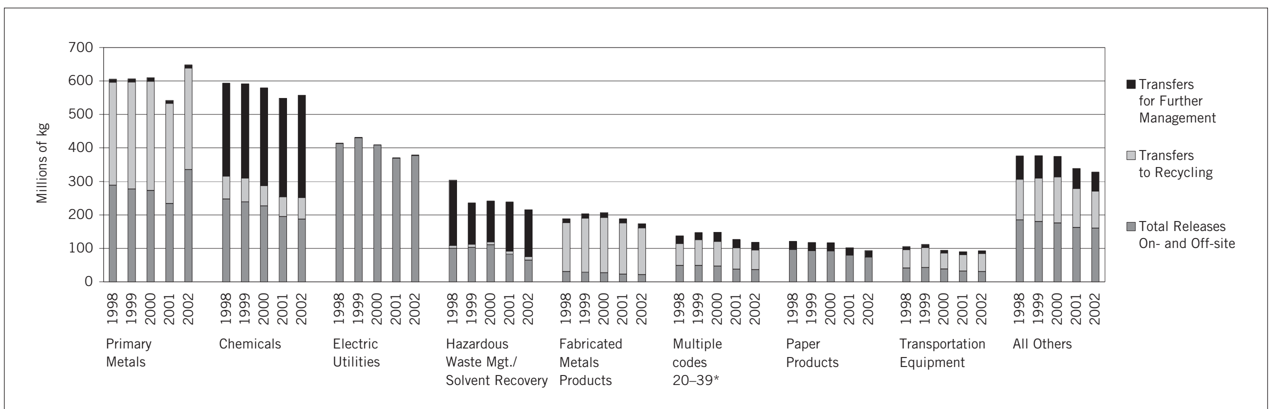


Table 6–3. (*continued*)

		Total Other Transfers for Further Management					Total Reported Amounts of Releases and Transfers				
		1998		2002		Change 1998–2002	1998		2002		Change 1998–2002
US SIC Code	Industry	kg	Rank	kg	Rank	(%)	kg	Rank	kg	Rank	(%)
33	Primary Metals	10,424,314	10	10,303,185	8	-1	679,315,629	1	724,003,936	1	7
28	Chemicals	289,646,594	1	319,975,727	1	10	626,571,639	2	587,156,451	2	-6
491/493	Electric Utilities	16,276	23	34,366	23	111	434,820,700	3	400,360,291	3	-8
495/738	Hazardous Waste Mgt./Solvent Recovery	208,798,633	2	150,543,995	2	-28	340,806,246	4	236,610,613	4	-31
34	Fabricated Metals Products	12,459,606	6	14,304,988	6	15	243,210,588	5	230,636,678	5	-5
26	Paper Products	24,324,812	3	19,922,614	4	-18	145,039,704	6	123,548,326	6	-15
37	Transportation Equipment	11,090,453	9	9,140,304	9	-18	120,585,275	8	123,231,944	7	2
--	Multiple codes 20–39*	23,533,044	4	23,520,085	3	-0	137,425,133	7	118,556,178	8	-14
20	Food Products	15,091,114	5	17,325,728	5	15	46,878,090	12	63,301,966	9	35
36	Electronic/Electrical Equipment	12,259,513	8	10,891,537	7	-11	77,362,991	9	60,214,469	10	-22
30	Rubber and Plastics Products	6,485,313	12	5,986,215	11	-8	66,819,331	10	49,654,107	11	-26
35	Industrial Machinery	3,269,450	14	1,207,431	19	-63	45,174,103	13	48,944,592	12	8
29	Petroleum and Coal Products	6,987,193	11	5,053,503	12	-28	49,045,640	11	46,930,297	13	-4
32	Stone/Clay/Glass Products	4,014,325	13	4,060,938	13	1	19,785,699	14	21,654,249	14	9
24	Lumber and Wood Products	1,258,908	20	1,735,324	16	38	18,499,798	15	20,883,957	15	13
27	Printing and Publishing	2,085,623	18	2,346,001	14	12	16,828,223	17	16,997,559	16	1
39	Misc. Manufacturing Industries	2,489,548	15	1,258,613	17	-49	16,952,334	16	14,095,955	17	-17
38	Measurement/Photographic Instruments	2,468,800	16	2,082,050	15	-16	11,859,062	20	8,751,260	18	-26
25	Furniture and Fixtures	2,321,940	17	1,211,402	18	-48	15,017,499	18	7,612,528	19	-49
5169	Chemical Wholesalers	12,288,149	7	6,103,120	10	-50	13,995,192	19	6,570,203	20	-53
22	Textile Mill Products	1,304,443	19	1,065,882	20	-18	7,268,321	21	4,182,869	21	-42
12	Coal Mining	0	25	0	25	--	2,127,453	22	2,056,641	22	-3
31	Leather Products	31,816	22	62,098	22	95	1,663,757	23	828,448	23	-50
21	Tobacco Products	5,189	24	571	24	-89	626,541	24	460,442	24	-27
23	Apparel and Other Textile Products	55,534	21	166,780	21	200	249,816	25	309,215	25	24
	Total	**652,710,589**		**608,302,456**		**-7**	**3,137,928,761**		**2,917,553,174**		**-7**

Note: Canada and US data only. Mexico data not available for 1998–2002.
* Multiple SIC codes reported only in TRI.

Figure 6–3. Change in TRI Total Reported Amounts of Releases and Transfers for Industries with Largest Total Amount, 1998–2002



* Multiple SIC codes reported only in TRI.

- Electric utilities reported a decrease of 8 percent, primarily as total releases. Sulfuric acid had the largest decreases for this sector, while the metals zinc and nickel and their compounds had the largest increases in total releases and transfers. The decrease came from TRI facilities, which reported an overall decrease of 9 percent. NPRI electric utilities reported an overall increase of 4 percent from 1998 to 2002.
- Hazardous waste facilities reported a decrease of 31 percent in total releases and transfers, primarily as total releases and other transfers for further waste management. This included a reduction of 29 percent from TRI facilities and of 42 percent from NPRI facilities. Transfers to recycling from this sector increased by 28 percent. Overall, zinc and its compounds, naphthalene and toluene had the largest decreases, while methanol, di(2-ethylhexyl) phthalate and ethylene glycol were the chemicals with the largest increases in total releases and transfers.
- Releases and transfers from the fabricated metals industry fell by 5 percent, mainly as total releases (decreasing by 25 percent). Its transfers to recycling also fell, by 3 percent, while other transfers for further management increased by 15 percent. Chromium, zinc and manganese and their compounds had the largest decreases in total releases and transfers for this sector, while copper and its compounds and nitric acid and nitrate compounds had the largest increases. This industry ranked second in NPRI and had a 4-percent increase from 1998 to 2002. TRI fabricated metals facilities ranked fifth in TRI and reported an 8-percent decrease.

6.2.3 Facilities with Largest Change in Total Releases On- and Off-site, NPRI and TRI, 1998–2002

- Among NPRI facilities, the largest decreases in total releases were reported by two hazardous waste management facilities, both owned by Philip Services and located in Hamilton, Ontario. Philip's facility on Imperial Street reported 8.2 million kg in 1998, mainly as transfers to disposal of zinc and its compounds, and only 3,080 kg in 2002. Philip's Parkdale Avenue facility did not report to NPRI in 2002 after reporting almost 6.8 million kg in 1998.
- Four of the 10 NPRI facilities with the largest decreases were primary metals facilities, including smelters and steel mills, all located in Ontario. They included Gerdau AmeriSteel in Whitby, Dofasco Inc. in Hamilton, Ivaco Rolling Mills L.P. in L'Orignal, and Zalev Brothers Co. in Windsor.

Table 6–4. The NPRI Facilities with the Largest Change in Total Releases On- and Off-site, 1998–2002

North American Rank	NPRI Rank	Facility	City, Province	SIC Codes Canada	SIC Codes US
Largest Decrease					
6	1	Philip Services Corp., 52 Imperial St.	Hamilton, ON	77	495/738
7	2	Philip Services Inc., Parkdale Avenue Facility	Hamilton, ON	77	495/738
13	3	Gerdau AmeriSteel, Whitby	Whitby, ON	29	33
18	4	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33
21	5	Celanese Canada Inc., Edmonton Facility	Edmonton, AB	37	28
25	6	BFI Canada Inc., BFI Calgary Landfill	Calgary, AB	99	495/738
47	7	Bowater Maritimes Inc., Dalhousie Mill, Bowater Pulp and Paper Canada/OJI Paper	Dalhousie, NB	27	26
55	8	Ivaco Rolling Mills Limited Partnership	L'Orignal, ON	29	33
72	9	Zalev Brothers Co., Ferrous Processing & Trading Co.	Windsor, ON	29	33
74	10	Philip Services Inc., Rexdale Facility	Etobicoke, ON	77	495/738
Largest Increase					
8	1	Clean Harbors Canada Inc., Lambton Facility	Corunna, ON	49	495/738
15	2	Ontario Power Generation Inc, Nanticoke Generating Station	Nanticoke, ON	49	491/493
25	3	Teck Cominco Metals Ltd., Trail Operations	Trail, BC	29	33
32	4	Norske Skog Canada Limited, Crofton Division	Crofton, BC	27	26
61	5	Stora Enso, Stora Enso Port Hawkesbury Limited	Port Hawkesbury, NS	27	26
74	6	Eurocan Pulp and Paper Company, West Fraser Mills	Kitimat, BC	27	26
79	7	Clean Harbors Canada Inc., London Service Center	London, ON	99	495/738
85	8	Cargill Foods, Cargill High River Plant, Cargill Inc.	High River, AB	10	20
86	9	Canfor - Prince George Pulp and Paper Mills, Canadian Forest Products Ltd.	Prince George, BC	27	26
87	10	Cariboo Pulp and Paper Co., Daishowa Marubeni International Inc./Weldwood of Canada	Quesnel, BC	27	26

Table 6–4. (*continued*)

NPRI Rank	Forms 1998 Number	Forms 2002 Number	Total Releases On- and Off-site 1998 (kg)	Total Releases On- and Off-site 2002 (kg)	Total Releases On- and Off-site Change 1998–2002 (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of change at the facility)
Largest Decrease						
1	6	1	8,162,554	3,080	-8,159,474	Zinc and compounds (transfers of metals)
2	16	*	6,786,722	*	-6,786,722	Zinc/Manganese/Chromium and compounds (transfers of metals), Xylenes, Toluene, Methyl ethyl ketone (transfers to disposal)
3	5	5	6,469,735	1,239,451	-5,230,284	Zinc and compounds (transfers of metals)
4	16	18	6,567,403	2,784,147	-3,783,256	Zinc and compounds (transfers of metals)
5	11	10	3,632,874	446,773	-3,186,101	Methanol (UIJ)
6	1	*	2,802,160	*	-2,802,160	Asbestos (land)
7	2	2	1,698,700	15,213	-1,683,487	Sulfuric acid (air)
8	6	6	1,737,560	194,730	-1,542,830	Zinc and compounds (transfers of metals)
9	6	5	1,204,618	304	-1,204,314	Zinc/Copper and compounds (transfers of metals)
10	7	3	1,372,400	221,228	-1,151,172	Xylenes, Toluene (transfers to disposal)
Largest Increase						
1	13	13	50,407	4,871,558	4,821,151	Zinc/Manganese and compounds (land)
2	10	10	5,088,320	7,803,495	2,715,175	Hydrochloric acid (air)
3	8	11	222,507	2,021,870	1,799,363	Zinc and compounds (transfers of metals)
4	3	8	9,000	1,454,191	1,445,191	Hydrochloric acid, Methanol (air)
5	5	3	35,636	970,316	934,680	Methanol (air)
6	3	6	15,540	800,482	784,942	Methanol (air)
7	*	1	*	708,000	708,000	Zinc and compounds (transfers of metals)
8	1	2	142,895	796,542	653,647	Nitric acid and nitrate compounds (water)
9	4	10	439,000	1,091,977	652,977	Methanol (air), Manganese and compounds (land)
10	4	5	250,165	901,295	651,130	Methanol (air)

* Facility did not report matched chemicals in year indicated.
UIJ = underground injection.

- The NPRI facility reporting the largest increase in total releases was a hazardous waste management facility. Clean Harbors Canada Lambton facility, located in Corunna, Ontario, reported an increase of 4.8 million kg, mainly increases in on-site land disposal of metals.
- The facility with the second-largest increase was an electric utility located in Ontario (Ontario Power Generation Inc. in Nanticoke), with an increase of 2.7 million kg, mainly of air emissions of hydrochloric acid. (Only on-site air releases of hydrochloric acid are included in the matched data set.)
- Five of the 10 facilities with the largest increases in releases were in the paper products industry and were located in British Columbia and Nova Scotia. Their increases included methanol air releases. These NPRI paper facilities explained their increases as due to increases in production levels and/or a change in the method of estimation during the time period. A handbook developed by the National Council of the Paper Industry for Air and Stream Improvement (NCASI) was cited as the source for improved estimation methods that resulted in increased estimates and/or numbers of chemicals reported.

- The TRI facility with the largest decrease in total releases was the primary metals facility US Magnesium L.L.C. located in Rowley, Utah. This facility reported a decrease of 19.5 million kg, from 26.2 million kg in 1998 to 6.7 million kg in 2002, mainly in chlorine air releases, and cited a decrease in production as the cause of the reduction, as well as process changes due to a state requirement.
- Five other primary metals facilities were among the 10 facilities with the largest decreases, including the second-largest, the ASARCO Inc. plant in East Helena, Montana, which reported 17.6 million kg in 1998 and did not report to TRI for 2002 due to discontinued operations at this site.
- The facility with the third-largest decrease was the hazardous waste facility Envirosafe Services of Ohio in Oregon, Ohio, reporting a decrease of 15.1 million kg, mainly in on-site land disposal of zinc and its compounds.

Table 6–5. The TRI Facilities with the Largest Change in Total Releases On- and Off-site, 1998–2002

North American Rank	TRI Rank	Facility	City, State	US SIC Codes
Largest Decrease				
1	1	US Magnesium L.L.C., Renco Group Inc.	Rowley, UT	33
2	2	ASARCO Inc., Americas Mining Corp.	East Helena, MT	33
3	3	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH	495/738
4	4	AK Steel Butler Works (Route 8 S)	Butler, PA	33
5	5	Phelps Dodge Hidalgo Inc., Phelps Dodge Corp.	Playas, NM	33
8	6	American Chrome & Chemicals L.P.	Corpus Christi, TX	28
9	7	Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington, OR	495/738
10	8	ASARCO Inc. Ray Complex Hayden Smelter & Concentrator, Americas Mining Corp.	Hayden, AZ	33
11	9	Northwestern Steel & Wire Co.	Sterling, IL	33
12	10	DuPont Victoria Plant	Victoria, TX	28
Largest Increase				
1	1	BHP Copper N.A. San Manuel Ops.	San Manuel, AZ	33
2	2	AK Steel Corp. (Rockport Works)	Rockport, IN	33
3	3	National Steel Corp. Greatlakes Ops.	Ecorse, MI	33
4	4	Solutia - Chocolate Bayou	Alvin, TX	28
5	5	Steel Dynamics Inc.	Butler, IN	33
6	6	Nucor Steel, Nucor Corp.	Huger, SC	33
7	7	US TVA Johnsonville Fossil Plant	New Johnsonville, TN	491/493
9	8	Nucor Steel, Nucor Corp.	Crawfordsville, IN	33
10	9	Reliant Energy Keystone Power Plant	Shelocta, PA	491/493
11	10	ISPAT Inland Inc., ISPAT Intl. N.V.	East Chicago, IN	33

Table 6–5. (*continued*)

	Forms		Total Releases On- and Off-site			
	1998	2002	1998	2002	Change 1998–2002	Major Chemicals Reported (Primary Media/Transfers)
TRI Rank	Number	Number	(kg)	(kg)	(kg)	(chemicals accounting for more than 70% of change at the facility)
Largest Decrease						
1	5	3	26,163,746	6,699,791	-19,463,955	Chlorine (air)
2	7	*	17,628,948	*	-17,628,948	Zinc and compounds (land)
3	8	7	21,193,528	6,050,662	-15,142,866	Zinc and compounds (land)
4	12	10	14,337,268	1,234,873	-13,102,394	Nitric acid and nitrate compounds (water)
5	13	*	9,533,364	*	-9,533,364	Zinc/Copper and compounds (land)
6	2	1	7,268,732	572,988	-6,695,744	Chromium and compounds (land)
7	20	11	9,423,638	2,956,678	-6,466,960	Aluminum oxide (land)
8	8	10	19,700,934	14,042,463	-5,658,471	Copper and compounds (land)
9	5	*	5,653,156	*	-5,653,156	Zinc/Manganese and compounds (land)
10	28	28	9,713,640	4,383,194	-5,330,446	Nitric acid and nitrate compounds (UIJ)
Largest Increase						
1	8	5	1,758,772	110,611,077	108,852,305	Copper/Manganese and compounds (land)
2	*	6	*	9,671,796	9,671,796	Nitric acid and nitrate compounds (water)
3	19	19	5,038,621	12,567,895	7,529,273	Zinc and compounds (transfers of metals)
4	16	21	1,438,471	7,624,696	6,186,225	Acrylonitrile, Acrylic acid (UIJ)
5	2	13	4,554,503	10,534,380	5,979,877	Zinc and compounds (transfers of metals)
6	5	6	2,242,382	7,497,353	5,254,971	Zinc and compounds (transfers of metals)
7	10	10	2,692,868	7,669,488	4,976,619	Hydrochloric acid (air)
8	6	6	8,733,859	12,242,084	3,508,226	Zinc and compounds (transfers of metals)
9	8	9	4,078,685	7,494,841	3,416,156	Hydrochloric acid (air)
10	13	14	337,672	3,748,380	3,410,707	Zinc and compounds (transfers of metals)

* Facility did not report matched chemicals in year indicated.
UIJ = underground injection.

- Among TRI facilities, the largest increase in total releases was reported by the primary metals facility BHP Copper N.A. San Manuel Ops. in San Manuel, Arizona. It reported an increase of 108.9 million kg. The facility reported it had an increase in on-site land disposal due to discontinued operations related to mining.
- Six other primary metals facilities were among the 10 facilities with the largest increases, including the second-largest, the AK Steel plant in Rockport, Indiana. It reported an increase of 9.7 million kg, mainly in surface water discharges of nitrate compounds.
- Two of the 10 facilities with the largest increases were electric utilities located in Tennessee and Pennsylvania. The other was a chemical manufacturer in Texas.

6.3 Facilities Reporting in Both Years Compared to Facilities Reporting in One Year Only, NPRI and TRI

In this section, the effects of the change in the number of facilities from 1998 to 2002 are analyzed. During this span, NPRI saw an increase of 41 percent in the number of facilities reporting, while the number of TRI facilities dropped by 10 percent (see **Table 6–1**). These changes in the number of facilities are part of the overall increase or decrease in amounts reported.

Facilities may start or stop reporting for various reasons, including changes in levels of business activity that put them above or below reporting thresholds, changes in operations that alter the chemicals they use, the adoption of pollution prevention or control activities that put them below reporting thresholds, or simply complying with PRTR reporting requirements. Data from newly reporting facilities, therefore, are difficult to interpret, as they can represent actual changes in releases and transfers, or represent chemical releases and transfers that have been ongoing, but are only now being reported. This analysis describes the effect of changes in the number of facilities from 1998 to 2002, mainly facilities that started reporting in NPRI and stopped reporting in TRI. In this section, the changes in releases and transfers are shown for two groups:

- facilities reporting only in one of the two years 1998 and 2002 (which includes the newly reporting facilities that reported in 2002 but not in 1998 and facilities that stopped reporting, i.e., that reported in 1998 but not in 2002), and
- facilities that reported in both 1998 and 2002.

Also, 31 facilities (four in NPRI and 27 in TRI) reported large increases (less than 100,000 kg in 1998 and 1 million kg or more of total releases and transfers in 2002). These facilities are also separated so they do not dominate the analysis.

Table 6–6. Change in Releases and Transfers, NPRI, for Facilities Reporting in One Year Compared to Facilities Reporting in Both Years, 1998 and 2002

	Reported in One Year Only		Facilities with Large Increase***			Facilities Reporting in Both Years (without Facilities with Large Increase)			
	1998	2002	1998	2002	Change 1998–2002	1998	2002	Change 1998–2002	
	Number	Number	Number	Number	Number	Number	Number	Number	%
Total Facilities	236	848	4	4	0	1,269	1,269	0	0
Total Forms	499	2,217	28	37	9	4,381	4,891	510	12
Releases On- and Off-site	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**%**
On-site Releases*	**8,159,880**	**9,896,904**	**69,588**	**6,428,193**	**6,358,605**	**95,438,306**	**92,843,316**	**-2,594,990**	**-3**
Air	4,302,836	9,065,601	19,170	1,400,312	1,381,142	76,944,333	77,421,724	477,391	1
Surface Water	400,495	416,397	0	153,840	153,840	4,346,365	5,689,886	1,343,521	31
Underground Injection	0	300	0	0	0	3,700,389	1,110,507	-2,589,882	-70
Land	3,440,374	370,882	50,287	4,873,405	4,823,118	10,341,149	8,550,697	-1,790,452	-17
Off-site Releases	**7,809,566**	**2,925,152**	**0**	**11,140**	**11,140**	**42,560,200**	**24,957,543**	**-17,602,657**	**-41**
Transfers to Disposal (except metals)	3,637,369	364,951	0	0	0	5,614,222	3,598,800	-2,015,422	-36
Transfers of Metals**	4,172,197	2,560,201	0	11,140	11,140	36,945,978	21,358,743	-15,587,235	-42
Total Reported Releases On- and Off-site	**15,969,446**	**12,822,056**	**69,588**	**6,439,333**	**6,369,745**	**137,998,506**	**117,800,859**	**-20,197,647**	**-15**
Off-site Transfers to Recycling	**11,961,730**	**34,366,470**	**0**	**925,800**	**925,800**	**96,752,830**	**107,979,865**	**11,227,035**	**12**
Transfers to Recycling of Metals	10,645,064	31,901,942	0	925,800	925,800	83,141,893	95,086,016	11,944,123	14
Transfers to Recycling (except metals)	1,316,666	2,464,528	0	0	0	13,610,937	12,893,849	-717,088	-5
Other Off-site Transfers for Further Management	**7,318,246**	**6,623,574**	**33,870**	**1,746,593**	**1,712,723**	**20,875,792**	**22,406,662**	**1,530,870**	**7**
Energy Recovery (except metals)	6,745,820	658,280	0	1,494,788	1,494,788	5,377,731	6,031,302	653,571	12
Treatment (except metals)	570,857	4,785,463	33,870	251,776	217,906	10,136,828	9,403,144	-733,684	-7
Sewage (except metals)	1,569	1,179,831	0	29	29	5,361,233	6,972,216	1,610,983	30
Total Reported Amounts of Releases and Transfers	**35,249,422**	**53,812,100**	**103,458**	**9,111,726**	**9,008,268**	**255,627,128**	**248,187,386**	**-7,439,742**	**-3**

* The sum of air, surface water, underground injection and land releases does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

** Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

*** Four facilities that reported less than 100,000 kg in 1998 and more than 1,000,000 kg in 2002.

6.3.1 NPRI Facilities

In NPRI, there were 848 newly reporting facilities, which reported 53.8 million kg of releases and transfers in 2002. According to Environment Canada, this increase in the number of newly reporting industries is the result of a number of factors, including ongoing compliance promotion, reporting changes and consultations on criteria air contaminants that increased awareness on the need to report, industrial association outreach, and overlap with Ontario's new monitoring regulations.

- Looking at the difference between facilities that have reported in both years and all facilities (which includes starting and stopping facilities) gives information on the influence of the facilities that have started reporting and stopped reporting. NPRI facilities reporting in both years reported an overall decrease in on-site releases of 3 percent, as opposed to a 5-percent increase for all NPRI facilities (see **Table 6–1**).
- Much of the overall increase in on-site releases reported by all NPRI facilities can be attributed to the four facilities with large increases from 1998 to 2002. These facilities reported an increase in on-site releases of 6.4 million kg, with on-site air emissions increasing by 1.4 million kg and on-site land releases by 4.8 million kg. In addition, facilities that started reporting, had air emissions of 9.1 million kg, more than twice the amount reported by facilities that stopped reporting.
- NPRI facilities reporting in both years reported an overall increase of 12 percent in transfers to recycling while

Table 6–7. Change in Releases and Transfers, TRI, for Facilities Reporting in One Year Compared to Facilities Reporting in Both Years, 1998 and 2002

	Reported in One Year Only		Facilities with Large Increase**			Facilities Reporting in Both Years (without Facilities with Large Increase in Reporting)			
	1998 Number	2002 Number	1998 Number	2002 Number	Change 1998–2002 Number	1998 Number	2002 Number	Change 1998–2002 Number	Change 1998–2002 %
Total Facilities	5,025	3,047	27	27	0	15,171	15,171	0	0
Total Forms	10,547	5,832	132	179	47	54,042	52,360	-1,682	-3
Releases On- and Off-site	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**%**
Total On-site Releases	**99,088,520**	**30,870,364**	**215,295**	**7,981,894**	**7,766,599**	**1,148,493,457**	**1,033,054,938**	**-115,438,518**	**-10**
Air	49,999,413	15,140,780	169,832	753,727	583,895	740,146,012	606,909,851	-133,236,161	-18
Surface Water	6,285,570	13,735,063	22,289	371,926	349,637	102,783,324	84,288,217	-18,495,107	-18
Underground Injection	3,515,540	5	0	0	0	77,977,785	71,603,277	-6,374,508	-8
Land	39,287,998	1,994,516	23,174	6,856,241	6,833,067	227,586,337	270,253,594	42,667,258	19
Off-site Releases	**16,609,630**	**10,603,843**	**197,327**	**4,807,228**	**4,609,900**	**186,012,028**	**197,438,417**	**11,426,388**	**6**
Transfers to Disposal (except metals)	3,898,235	942,611	4,989	14,964	9,975	19,724,506	18,125,398	-1,599,108	-8
Transfers of Metals*	12,711,395	9,661,232	192,339	4,792,264	4,599,925	166,287,522	179,313,018	13,025,496	8
Total Reported Releases On- and Off-site	**115,698,150**	**41,474,207**	**412,623**	**12,789,122**	**12,376,500**	**1,334,505,485**	**1,230,493,355**	**-104,012,130**	**-8**
Off-site Transfers to Recycling	**77,053,912**	**46,465,824**	**177,106**	**36,048,056**	**35,870,950**	**694,618,797**	**661,645,772**	**-32,973,025**	**-5**
Transfers to Recycling of Metals	66,722,507	40,207,547	157,402	35,747,388	35,589,986	577,910,017	551,611,604	-26,298,413	-5
Transfers to Recycling (except metals)	10,331,405	6,258,277	19,703	300,667	280,964	116,708,780	110,034,168	-6,674,612	-6
Other Off-site Transfers for Further Management	**63,923,519**	**31,723,620**	**183,652**	**9,655,248**	**9,471,596**	**560,375,511**	**536,146,759**	**-24,228,752**	**-4**
Energy Recovery (except metals)	46,476,936	10,688,641	27,949	4,641,637	4,613,688	326,920,217	312,200,107	-14,720,110	-5
Treatment (except metals)	5,419,019	7,970,542	69,219	3,306,664	3,237,445	114,256,985	95,490,918	-18,766,067	-16
Sewage (except metals)	12,027,564	13,064,437	86,485	1,706,948	1,620,463	119,198,308	128,455,733	9,257,425	8
Total Reported Amounts of Releases and Transfers	**256,675,581**	**119,663,651**	**773,380**	**58,492,426**	**57,719,046**	**2,589,499,792**	**2,428,285,885**	**-161,213,907**	**-6**

* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.
** Twenty-seven facilities that reported less than 100,000 kg in 1998 and more than 1,000,000 kg in 2002.

all NPRI facilities reported an increase of 32 percent. Much of this difference is due to facilities that started reporting. These facilities reported 22.4 million kg more than the amount transferred to recycling by facilities that stopped reporting.

- The newly reporting NPRI facilities (reporting in 2002 and not in 1998) reported 53.8 million kg of total releases and transfers in 2002. This was 18.6 million kg more than facilities that stopped reporting (reported in 1998 and not in 2002). These newly reporting facilities offset the decrease that would have otherwise been seen in on-site releases due to facilities no longer reporting, particularly in air emissions and off-site transfers to recycling of metals. These newly reporting facilities are the reason why on-site releases show an overall increase in NPRI. The facilities that stopped reporting had more off-site releases and other off-site transfers for further management than those that started reporting, however.
- The four NPRI facilities reporting large increases reported increases in on-site releases primarily, with an increase of 4.8 million kg in on-site land releases, 1.4 million kg in on-site air releases, and 154,000 kg in on-site surface water discharges.
- Therefore, newly reporting facilities and those that stopped reporting, as well as facilities with large increases, had a significant effect on the changes in NPRI releases and transfers from 1998 to 2002. This effect was most pronounced in a few categories: on-site air and land releases and transfers to recycling, where they changed the trend from a decrease to an increase.

6.3.2 TRI Facilities

- The overall pattern of trends from 1998 to 2002 was the same for TRI facilities reporting in both 1998 and 2002 as it was for all TRI facilities (see **Table 6-1**), although the actual percentages differed somewhat. This indicates that facilities that started reporting and stopped reporting had little effect on the time trend in TRI.
- The 119.7 million kg of releases and transfers from newly reporting TRI facilities did not offset the decreases of 256.7 million kg from the facilities that stopped reporting. This is the opposite situation to NPRI.
- Except for surface water discharges, newly reporting TRI facilities did not report more on-site releases than those that stopped reporting. Thus, while the overall decrease in TRI surface water discharges was 10 percent, it was 18 percent for those TRI facilities that reported in both 1998 and 2002.
- There were also 27 TRI facilities that reported large increases in releases and transfers from 1998 to 2002, totaling 57.7 million kg. These increases were primarily on-site land, off-site releases (transfers of metals to disposal), and off-site transfers to recycling and to energy recovery.
- Much of the decrease in off-site transfers for energy recovery by TRI facilities can be attributed to facilities that stopped reporting. These facilities reported 46.5 million kg in 1998. The total decrease from 1998 and 2002 for all TRI facilities in the matched database was 45.9 million kg.

6.3.3 Average Releases and Transfers per Facility, Facilities Reporting in Both Years, NPRI and TRI, 1998–2002

- For facilities reporting in both 1998 and 2002, NPRI average total releases and transfers per facility were 1.2 times those of TRI in both 1998 and 2002.
- Average total on-site releases per facility decreased for both NPRI and TRI, but the decrease was larger in TRI so that the NPRI/TRI ratio went from slightly less than 1.0 in 1998 to 1.1 in 2002. The NPRI/TRI ratio went from 1.2 to 1.5 for on-site air releases.
- Average surface water discharges increased for NPRI and decreased for TRI facilities. Therefore, the NPRI/TRI ratio for surface water discharges increased from 0.5 to 0.8 from 1998 to 2002.
- Average off-site releases per facility decreased substantially in NPRI while they increased for TRI. The NPRI/TRI ratio for off-site releases fell from 2.7 in 1998 to 1.5 in 2002. Three NPRI facilities accounted for much of this change, two Philip Services facility in Hamilton, Ontario, and the Gerdau AmeriSteel facility in Whitby, Ontario. From 1998 to 2002 these three facilities reported a decrease in off-site releases (of metals to disposal) of 16.4 million kg out of a total for NPRI of 15.6 million kg.
- Average off-site transfers to recycling remained almost twice as high for NPRI, with the NPRI/TRI ratio 1.7 in 1998 and 2.0 in 2002. In particular, this is true for recycling of metals, for which the NPRI/TRI ratio was 1.7 in 1998 and 2.1 in 2002.
- On the other hand, the average of other transfers for further management per facility were more than twice as high for TRI than for NPRI and the NPRI/TRI ratio was about the same in both years, at 0.4 in 1998 and 0.5 in 2002.

Table 6–8. Average Total Releases and Transfers per Facility, NPRI and TRI, 1998 and 2002, for Facilities Reporting in Both Years

	NPRI		TRI		Ratio of Average per Facility (NPRI/TRI)	
	1998 (kg/facility)	2002 (kg/facility)	1998 (kg/facility)	2002 (kg/facility)	1998	2002
On-site Releases	**75,207**	**73,163**	**75,703**	**68,094**	**1.0**	**1.1**
Air	60,634	61,010	48,787	40,005	1.2	1.5
Surface Water	3,425	4,484	6,775	5,556	0.5	0.8
Underground Injection	2,916	875	5,140	4,720	0.6	0.2
Land	8,149	6,738	15,001	17,814	0.5	0.4
Off-site Releases	**33,538**	**19,667**	**12,261**	**13,014**	**2.7**	**1.5**
Transfers to Disposal (except metals)	4,424	2,836	1,300	1,195	3.4	2.4
Transfers of Metals	29,114	16,831	10,961	11,819	2.7	1.4
Total Reported Releases On- and Off-site	**108,746**	**92,830**	**87,964**	**81,108**	**1.2**	**1.1**
Off-site Transfers to Recycling	**76,243**	**85,091**	**45,786**	**43,613**	**1.7**	**2.0**
Transfers to Recycling of Metals	65,518	74,930	38,093	36,360	1.7	2.1
Transfers to Recycling (except metals)	10,726	10,161	7,693	7,253	1.4	1.4
Other Off-site Transfers for Further Management	**16,451**	**17,657**	**36,937**	**35,340**	**0.4**	**0.5**
Energy Recovery (except metals)	4,238	4,753	21,549	20,579	0.2	0.2
Treatment (except metals)	7,988	7,410	7,531	6,294	1.1	1.2
Sewage (except metals)	4,225	5,494	7,857	8,467	0.5	0.6
Total Reported Amounts of Releases and Transfers	**201,440**	**195,577**	**170,687**	**160,061**	**1.2**	**1.2**

6.4 Exploring Trends for Facilities Reporting Different Amounts

The overall quantities reported to NPRI and TRI are dominated by facilities reporting the largest releases and transfers. While this is an important group, it is a relatively small number of facilities. This section analyzes the changes in releases and transfers for the majority of facilities that report to NPRI and TRI. This majority reports smaller amounts and so tends to be overshadowed by the fewer facilities that report larger amounts.

This section asks the question “Are facilities that reported smaller amounts of releases and transfers showing the same decreasing trend as facilities that reported larger amounts?” This section divides the facilities that reported in both years into four separate groups, depending on the amount of total releases and transfers reported in 1998:

- Group 1: Smaller Reporters: facilities reporting total releases and transfers of less than 10,000 kg in 1998,
- Group Two: Medium Reporters: facilities reporting total releases and transfers of equal to or greater than 10,000 kg and less than 100,000 kg in 1998,
- Group Three: Larger Reporters: facilities reporting total releases and transfers of equal to or greater than 100,000 kg and less than 1,000,000 kg in 1998, and
- Group Four: Largest Reporters: facilities reporting releases and transfers of 1,000,000 kg or more in 1998.

Table 6–9. Summary of Total Reported Amounts of Releases and Transfers in North America, by Facilities Reporting in Both Years, 1998 and 2002

	Amount of Total Releases and Transfers Reported per Facility in 1998							
	≤10,000 kg in 1998		>10,000 kg and ≤100,000 kg in 1998		>100,000 kg and ≤1,000,000 kg in 1998		>1,000,000 kg in 1998	
	1998 Number	2002 Number	1998 Number	2002 Number	1998 Number	2002 Number	1998 Number	2002 Number
Total Facilities	7,437	7,437	5,660	5,660	2,728	2,728	615	615
Total Forms	16,705	17,169	18,054	17,377	17,449	16,757	6,215	5,948
Releases On- and Off-site	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**
On-site Releases	**7,555,886**	**19,062,143**	**88,696,787**	**88,252,206**	**392,552,007**	**325,729,532**	**755,127,083**	**692,854,373**
Air	7,077,665	13,039,061	80,564,833	75,913,261	305,644,257	241,738,890	423,803,590	353,640,363
Surface Water	168,466	4,393,363	4,654,375	6,835,384	40,366,210	44,153,163	61,940,637	34,596,194
Underground Injection	8,803	6,370	178,387	166,283	5,729,165	5,229,745	75,761,820	67,311,386
Land	255,311	1,596,356	3,271,323	5,321,286	40,784,376	34,583,159	193,616,476	237,303,490
Off-site Releases	**2,651,494**	**7,391,942**	**19,994,112**	**22,227,352**	**59,036,815**	**55,355,225**	**146,889,807**	**137,421,441**
Transfers to Disposal (except metals)	562,431	1,487,975	4,016,116	5,365,276	11,076,508	9,476,284	9,683,673	5,394,664
Transfers of Metals*	2,089,064	5,903,968	15,977,995	16,862,076	47,960,307	45,878,941	137,206,134	132,026,777
Total Reported Releases On- and Off-site	**10,207,381**	**26,454,085**	**108,690,898**	**110,479,558**	**451,588,822**	**381,084,757**	**902,016,890**	**830,275,814**
Off-site Transfers to Recycling	**3,729,158**	**30,180,995**	**61,188,590**	**83,844,335**	**269,086,342**	**267,273,220**	**457,367,537**	**388,327,087**
Transfers to Recycling of Metals	3,197,545	27,156,357	50,147,444	70,183,107	218,489,601	218,024,116	389,217,320	331,334,040
Transfers to Recycling (except metals)	531,613	3,024,638	11,041,146	13,661,228	50,596,741	49,249,104	68,150,217	56,993,046
Other Off-site Transfers for Further Management	**2,583,161**	**13,216,060**	**40,317,854**	**48,497,265**	**149,559,505**	**149,530,536**	**388,790,782**	**347,309,560**
Energy Recovery (except metals)	1,098,578	4,062,220	17,784,501	22,872,663	68,724,652	77,020,599	244,690,217	214,275,928
Treatment (except metals)	845,446	4,640,320	8,412,096	8,554,296	38,207,899	35,853,236	76,928,373	55,846,210
Sewage (except metals)	639,137	4,513,520	14,121,257	17,070,307	42,626,954	36,656,701	67,172,193	77,187,422
Total Reported Amounts of Releases and Transfers	**16,519,700**	**69,851,140**	**210,197,342**	**242,821,158**	**870,234,669**	**797,888,513**	**1,748,175,209**	**1,565,912,460**

	Change from 1998 to 2002							
	Number	%	Number	%	Number	%	Number	%
Total Forms	205	1	147	1	153	1	5	0
Releases On- and Off-site	**kg**	**%**	**kg**	**%**	**kg**	**%**	**kg**	**%**
On-site Releases	**11,506,256**	**152**	**-444,580**	**-1**	**-66,822,474**	**-17**	**-62,272,710**	**-8**
Air	5,961,396	84	-4,651,572	-6	-63,905,367	-21	-70,163,227	-17
Surface Water	4,224,897	2,508	2,181,009	47	3,786,952	9	-27,344,444	-44
Underground Injection	-2,433	-28	-12,103	-7	-499,420	-9	-8,450,434	-11
Land	1,341,045	525	2,049,963	63	-6,201,216	-15	43,687,014	23
Off-site Releases	**4,740,448**	**179**	**2,233,240**	**11**	**-3,681,591**	**-6**	**-9,468,366**	**-6**
Transfers to Disposal (except metals)	925,544	165	1,349,160	34	-1,600,225	-14	-4,289,009	-44
Transfers of Metals*	3,814,904	183	884,081	6	-2,081,366	-4	-5,179,357	-4
Total Reported Releases On- and Off-site	**16,246,704**	**159**	**1,788,660**	**2**	**-70,504,065**	**-16**	**-71,741,076**	**-8**
Off-site Transfers to Recycling	**26,451,837**	**709**	**22,655,745**	**37**	**-1,813,122**	**-1**	**-69,040,450**	**-15**
Transfers to Recycling of Metals	23,958,812	749	20,035,663	40	-465,486	-0.2	-57,883,279	-15
Transfers to Recycling (except metals)	2,493,025	469	2,620,082	24	-1,347,636	-3	-11,157,171	-16
Other Off-site Transfers for Further Management	**10,632,899**	**412**	**8,179,411**	**20**	**-28,969**	**-0.02**	**-41,481,222**	**-11**
Energy Recovery (except metals)	2,963,642	270	5,088,162	29	8,295,946	12	-30,414,289	-12
Treatment (except metals)	3,794,874	449	142,200	2	-2,354,662	-6	-21,082,162	-27
Sewage (except metals)	3,874,383	606	2,949,050	21	-5,970,253	-14	10,015,229	15
Total Reported Amounts of Releases and Transfers	**53,331,440**	**323**	**32,623,816**	**16**	**-72,346,156**	**-8**	**-182,262,749**	**-10**

Note: Data include 153 chemicals common to both NPRI and TRI lists from selected industrial and other sources.
* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

The nomenclature of "smaller," "medium," "larger," and "largest" is used here to assist the reader in following the discussion, and is meant in a relative sense not in a qualitative sense since it is based on amounts reported and not size of facility. This section includes reporting only by facilities that reported in both 1998 and 2002 and, in order to see underlying patterns, the analysis does not include 31 facilities with large increases (those that reported less than 100,000 kg in 1998 and 1 million kg or more in 2002).

- These groups differ in many ways. The largest reporters (those reporting more than 1,000,000 kg in 1998) made up only 4 percent of the total number of facilities reporting and yet contributed more than half of the total releases and transfers in 2002. Facilities in this group are not all necessarily large in terms of size or number of employees, but they are large in terms of the amount of releases and transfers.
- The first group, smaller reporters (those with totals of 10,000 kg or less in 1998), had substantial increases in all types of releases and transfers. The only exception was underground injection, which was not a common method of disposal for these facilities.
- Those facilities in the second group, medium reporters (those with totals of more than 10,000 kg but less than 100,000 kg in 1998), also had increases in releases and transfers. The exceptions were decreases in on-site air emissions and underground injection.
- The facilities in the larger and largest reporters groups showed mostly decreases.
- While it is encouraging that the largest reporters are decreasing their releases and transfers, it is of concern that most other facilities are increasing their releases and transfers. This means that the majority of the facilities are increasing their releases and transfers.

6.4.1 NPRI Facilities

This section analyzes the trends in releases and transfers of NPRI facilities reporting different amounts. Only those facilities reporting in both 1998 and 2002 are included. Also, the few facilities with the largest increases are not included.

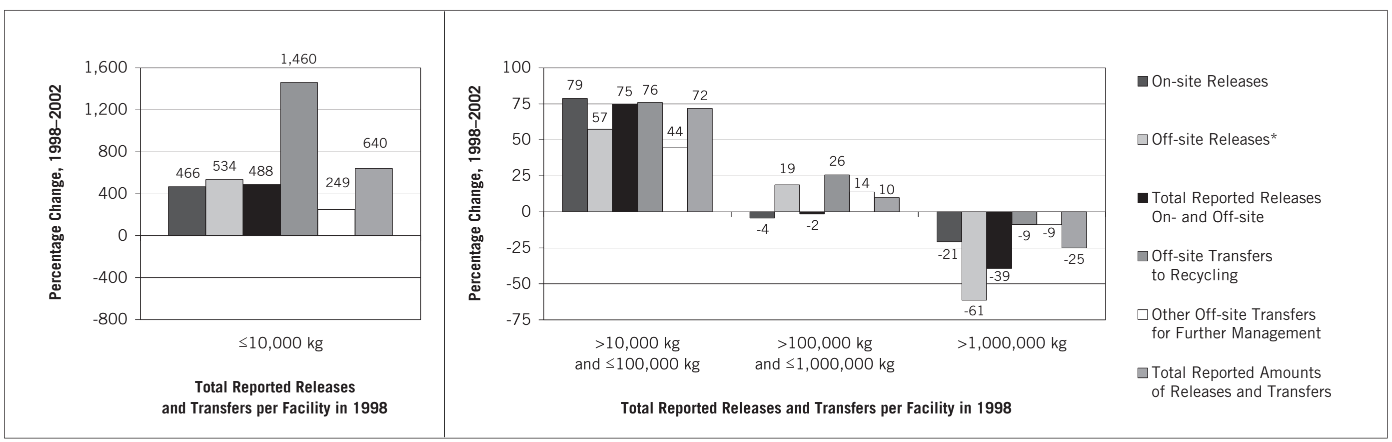
- In the first group, the smaller reporters (those with totals of 10,000 kg or less in 1998), there were 494 NPRI facilities, representing 39 percent of NPRI facilities reporting in both years, but only 3 percent of the total releases and transfers in 2002.
- This group of smaller reporters in NPRI showed an overall increase of over 600 percent in total releases and transfers. They showed substantial increases of over 100 percent in on- and off-site releases and in the various types of transfers.
- This pattern of increases by the group of smaller reporters also held for those facilities in the second group, medium reporters (between 10,000 kg and 100,000 kg in 1998). This group consisted of 410 facilities, representing almost one-third of NPRI facilities reporting in both years, but 11 percent of the total releases and transfers in 2002. The releases and transfers of the medium reporters increased 72 percent. This group also showed increases in most types of releases and transfers; the only exception was a 3-percent decrease in transfers to treatment.
- The third group, larger reporters (between 100,000 kg and 1,000,000 kg in 1998) also showed an overall increase (of 10 percent) in releases and transfers. Some types of releases and transfers did show decreases, including air emissions and transfers to disposal and to recycling of substances other than metals. This group consisted of 306 facilities or about one-quarter of NPRI facilities reporting in both years. Their total releases and transfers were 43 percent of the total in 2002.

Table 6–10. Summary of Total Reported Amounts of Releases and Transfers in NPRI, by Facilities Reporting in Both Years, 1998 and 2002

	Total Releases and Transfers Reported per Facility in 1998							
	≤10,000 kg		>10,000 kg and ≤100,000 kg		>100,000 kg and ≤1,000,000 kg		>1,000,000 kg	
	1998 Number	2002 Number	1998 Number	2002 Number	1998 Number	2002 Number	1998 Number	2002 Number
Total Facilities	494	494	410	410	306	306	59	59
Total Forms	1,127	1,332	1,132	1,279	1,706	1,859	416	421
Releases On- and Off-site	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**
On-site Releases*	**461,610**	**2,614,916**	**7,338,263**	**13,119,385**	**46,827,466**	**44,790,722**	**40,810,967**	**32,318,293**
Air	386,819	1,806,206	6,632,109	12,072,682	40,654,476	37,410,658	29,270,929	26,132,177
Surface Water	19,657	333,570	445,739	620,107	2,640,463	3,666,817	1,240,506	1,069,393
Underground Injection	2,350	2,920	3,100	1,851	396,840	803,378	3,298,099	302,358
Land	7,142	445,227	229,446	408,753	3,107,688	2,885,293	6,996,873	4,811,424
Off-site Releases	**209,980**	**1,330,693**	**1,678,526**	**2,640,317**	**6,552,241**	**7,785,878**	**34,119,453**	**13,200,655**
Transfers to Disposal (except metals)	44,174	116,739	217,977	479,840	2,314,701	1,386,170	3,037,370	1,616,051
Transfers of Metals**	165,806	1,213,954	1,460,549	2,160,477	4,237,540	6,399,708	31,082,083	11,584,604
Total Reported Releases On- and Off-site	**671,590**	**3,945,609**	**9,016,789**	**15,759,702**	**53,379,707**	**52,576,600**	**74,930,420**	**45,518,948**
Off-site Transfers to Recycling	**205,080**	**3,198,856**	**5,205,516**	**9,159,990**	**35,655,561**	**44,813,067**	**55,686,673**	**50,807,951**
Transfers to Recycling of Metals	149,855	2,984,472	3,973,009	7,327,481	25,250,009	34,868,998	53,769,020	49,905,064
Transfers to Recycling (except metals)	55,225	214,384	1,232,507	1,832,509	10,405,552	9,944,069	1,917,653	902,887
Other Off-site Transfers for Further Management	**166,812**	**581,926**	**1,769,206**	**2,556,346**	**8,899,858**	**10,128,513**	**10,039,916**	**9,139,877**
Energy Recovery (except metals)	25,721	73,974	356,626	724,875	1,966,591	2,390,378	3,028,793	2,842,075
Treatment (except metals)	123,714	417,571	1,037,995	1,003,507	5,895,086	6,909,316	3,080,033	1,072,750
Sewage (except metals)	17,377	90,381	374,585	827,964	1,038,181	828,819	3,931,090	5,225,052
Total Reported Amounts of Releases and Transfers	**1,043,482**	**7,726,392**	**15,991,511**	**27,476,038**	**97,935,126**	**107,518,180**	**140,657,009**	**105,466,776**

Note: Data include 153 chemicals common to both NPRI and TRI lists from selected industrial and other sources.
* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.
** Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

Figure 6–4. Percentage Change in Total Reported Amounts of Releases and Transfers in NPRI, by Facilities Reporting in Both Years, 1998 and 2002



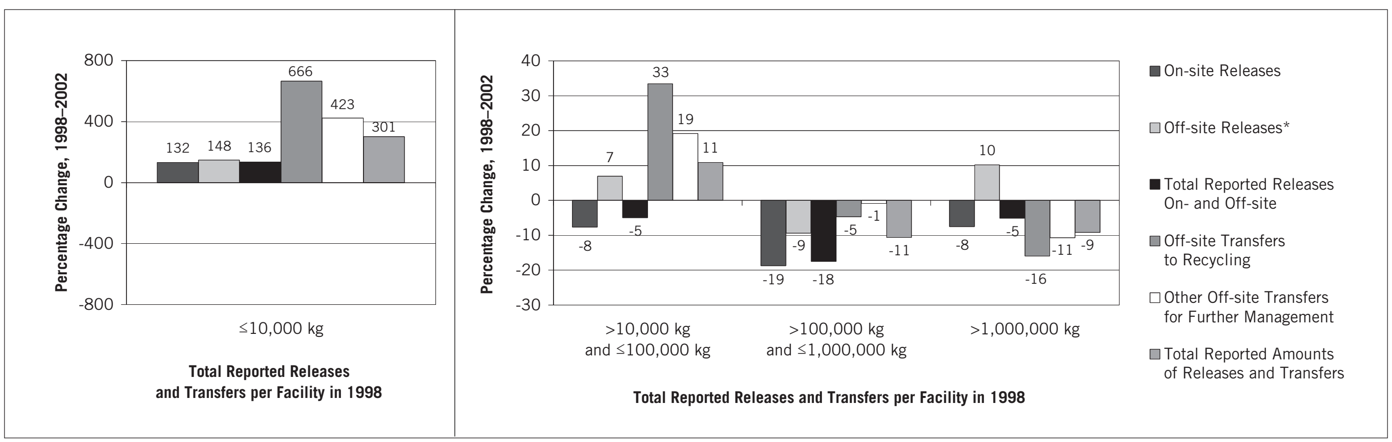
Note: Does not include facilities reporting only in 1998 or only in 2002 and does not include 4 facilities that reported less than 100,000 kg in 1998 and more than 1,000,000 kg in 2002.
* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

Table 6–11. Summary of Total Reported Amounts of Releases and Transfers in TRI, by Facilities Reporting in Both Years, 1998 and 2002

	Total Releases and Transfers Reported per Facility in 1998							
	≤10,000 kg		>10,000 kg and ≤100,000 kg		>100,000 kg and ≤1,000,000 kg		>1,000,000 kg	
	1998 Number	2002 Number	1998 Number	2002 Number	1998 Number	2002 Number	1998 Number	2002 Number
Total Facilities	6,943	6,943	5,250	5,250	2,422	2,422	556	556
Total Forms	15,578	15,837	16,922	16,098	15,743	14,898	5,799	5,527
Releases On- and Off-site	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**
On-site Releases	**7,094,276**	**16,447,226**	**81,358,524**	**75,132,821**	**345,724,541**	**280,938,811**	**714,316,116**	**660,536,080**
Air	6,690,846	11,232,855	73,932,724	63,840,579	264,989,781	204,328,232	394,532,661	327,508,185
Surface Water	148,809	4,059,793	4,208,636	6,215,277	37,725,747	40,486,346	60,700,131	33,526,801
Underground Injection	6,453	3,450	175,287	164,432	5,332,325	4,426,367	72,463,721	67,009,028
Land	248,169	1,151,128	3,041,877	4,912,533	37,676,688	31,697,866	186,619,603	232,492,066
Off-site Releases	**2,441,514**	**6,061,249**	**18,315,586**	**19,587,036**	**52,484,574**	**47,569,347**	**112,770,354**	**124,220,785**
Transfers to Disposal (except metals)	518,257	1,371,236	3,798,139	4,885,436	8,761,807	8,090,114	6,646,303	3,778,613
Transfers of Metals*	1,923,258	4,690,014	14,517,446	14,701,600	43,722,767	39,479,233	106,124,051	120,442,172
Total Reported Releases On- and Off-site	**9,535,791**	**22,508,476**	**99,674,109**	**94,719,857**	**398,209,115**	**328,508,157**	**827,086,470**	**784,756,865**
Off-site Transfers to Recycling	**3,524,078**	**26,982,139**	**55,983,074**	**74,684,344**	**233,430,781**	**222,460,153**	**401,680,864**	**337,519,136**
Transfers to Recycling of Metals	3,047,690	24,171,885	46,174,435	62,855,625	193,239,592	183,155,117	335,448,300	281,428,976
Transfers to Recycling (except metals)	476,388	2,810,254	9,808,639	11,828,719	40,191,189	39,305,035	66,232,564	56,090,159
Other Off-site Transfers for Further Management	**2,416,349**	**12,634,134**	**38,548,648**	**45,940,919**	**140,659,647**	**139,402,023**	**378,750,866**	**338,169,683**
Energy Recovery (except metals)	1,072,857	3,988,246	17,427,875	22,147,788	66,758,061	74,630,221	241,661,424	211,433,853
Treatment (except metals)	721,732	4,222,749	7,374,101	7,550,789	32,312,813	28,943,920	73,848,340	54,773,460
Sewage (except metals)	621,760	4,423,139	13,746,672	16,242,343	41,588,773	35,827,882	63,241,103	71,962,370
Total Reported Amounts of Releases and Transfers	**15,476,218**	**62,124,748**	**194,205,831**	**215,345,121**	**772,299,543**	**690,370,333**	**1,607,518,200**	**1,460,445,684**

Note: Data include 153 chemicals common to both NPRI and TRI lists from selected industrial and other sources.
* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

Figure 6–5. Percentage Change in Total Reported Amounts of Releases and Transfers in TRI, by Facilities Reporting in Both Years, 1998 and 2002



Note: Does not include facilities reporting only in 1998 or only in 2002 and does not include 27 facilities that reported less than 100,000 kg in 1998 and more than 1,000,000 kg in 2002.
* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

- The group of largest reporters (those with 1,000,000 kg or more in 1998) was the only group to show an overall decrease (of 25 percent) from 1998 to 2002. Substantial decreases came in off-site releases (a 61-percent decrease), but almost all types of releases and transfers were down. The only exception was transfers to sewage, which rose by one-third. There were only 59 facilities in this group, or 5 percent of all NPRI facilities reporting both years, yet they reported 42 percent the total releases and transfers in 2002.

6.4.2 TRI Facilities

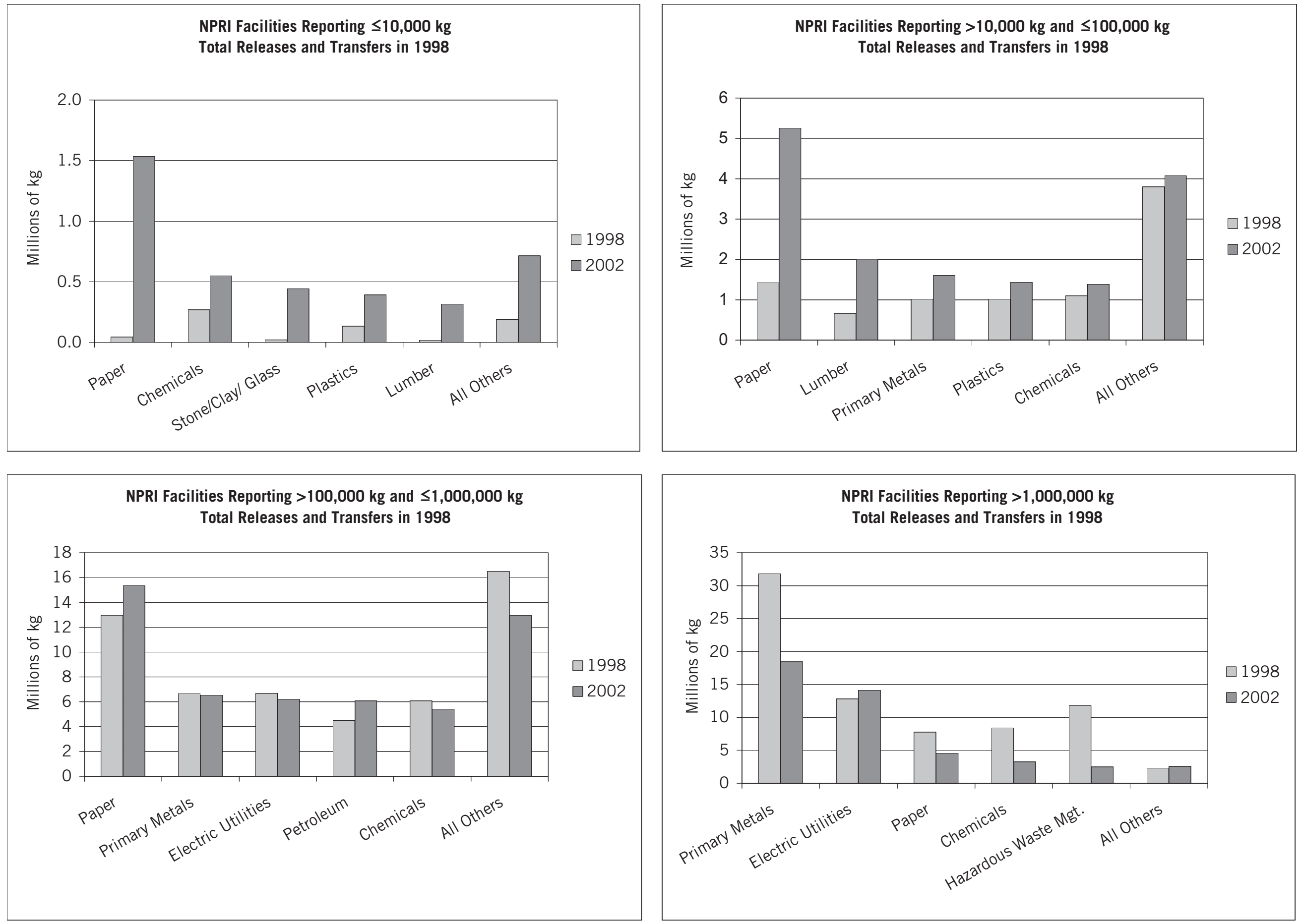
This section analyzes the trends in releases and transfers of TRI facilities reporting different amounts. Only those facilities reporting in both 1998 and 2002 are included. Also, the few facilities with the largest increases are not included.

- In the first group, smaller reporters (those with 10,000 kg or less in 1998), there were 6,943 TRI facilities, representing almost 46 percent of TRI facilities reporting in both 1998 and 2002. Their total releases and transfers were 3 percent of the total in 2002.
- The group of smaller reporters showed an overall increase of over 300 percent in total releases and transfers. They showed substantial increases, of over 100 percent, in virtually all types of on- and off-site releases and the various types of transfers. Air emissions increased by 68 percent. The exception was underground injection, which decreased but was not a common method of disposal for these facilities.
- This pattern of increases by the group of smaller reporters also held for the second group, medium reporters (between 10,000 kg and 100,000 kg in 1998). Releases and transfers increased by 11 percent for the medium reporters. This group also showed increases in off-site releases and off-site transfers to recycling and other transfers for further waste management. This group did report decreases in air emissions. This

differed from the medium reporters in NPRI, which showed increases in air emissions. This medium group consisted of 5,250 facilities, representing almost one-third of TRI facilities reporting both years and 9 percent of the total releases and transfers.

- The group of larger TRI reporters (between 100,000 kg and 1,000,000 kg in 1998) showed an overall decrease (of 11 percent), with most types of releases and transfers showing decreases, including a decrease of 23 percent for air emissions. The only exception was discharges to surface waters, which increased by 7 percent. This group consisted of 2,422 facilities, or about 16 percent of TRI facilities reporting in both years. Their total releases and transfers were 28 percent of the total for all TRI facilities in 2002.
- The group of largest reporters (those with 1,000,000 kg or more in 1998) in TRI also showed an overall decrease, of 9 percent from 1998 to 2002. This group of 556 facilities (4 percent of all TRI facilities reporting in both years) reported 60 percent of the total releases and transfers in 2002. Air emissions declined by 17 percent, surface water discharges fell by 45 percent, transfers to recycling were down by 16 percent, transfers to treatment fell by 26 percent, and transfers to energy recovery fell by 13 percent. For this group of largest reporters, not all types of releases and transfers showed decreases. On-site land disposal rose by 25 percent, off-site releases rose by 10 percent, and transfers to sewage rose by 14 percent.
- Three of the four groups (medium, larger and largest) reported decreases in air releases in TRI. Only two of the four groups (larger and largest) reported decreases in air releases in NPRI.

Figure 6–6. Contribution of Top Industry Sectors to Total Releases On- and Off-site, 2002: NPRI Facilites Reporting in Both Years Grouped by Amount of Total Releases and Transfers in 1998

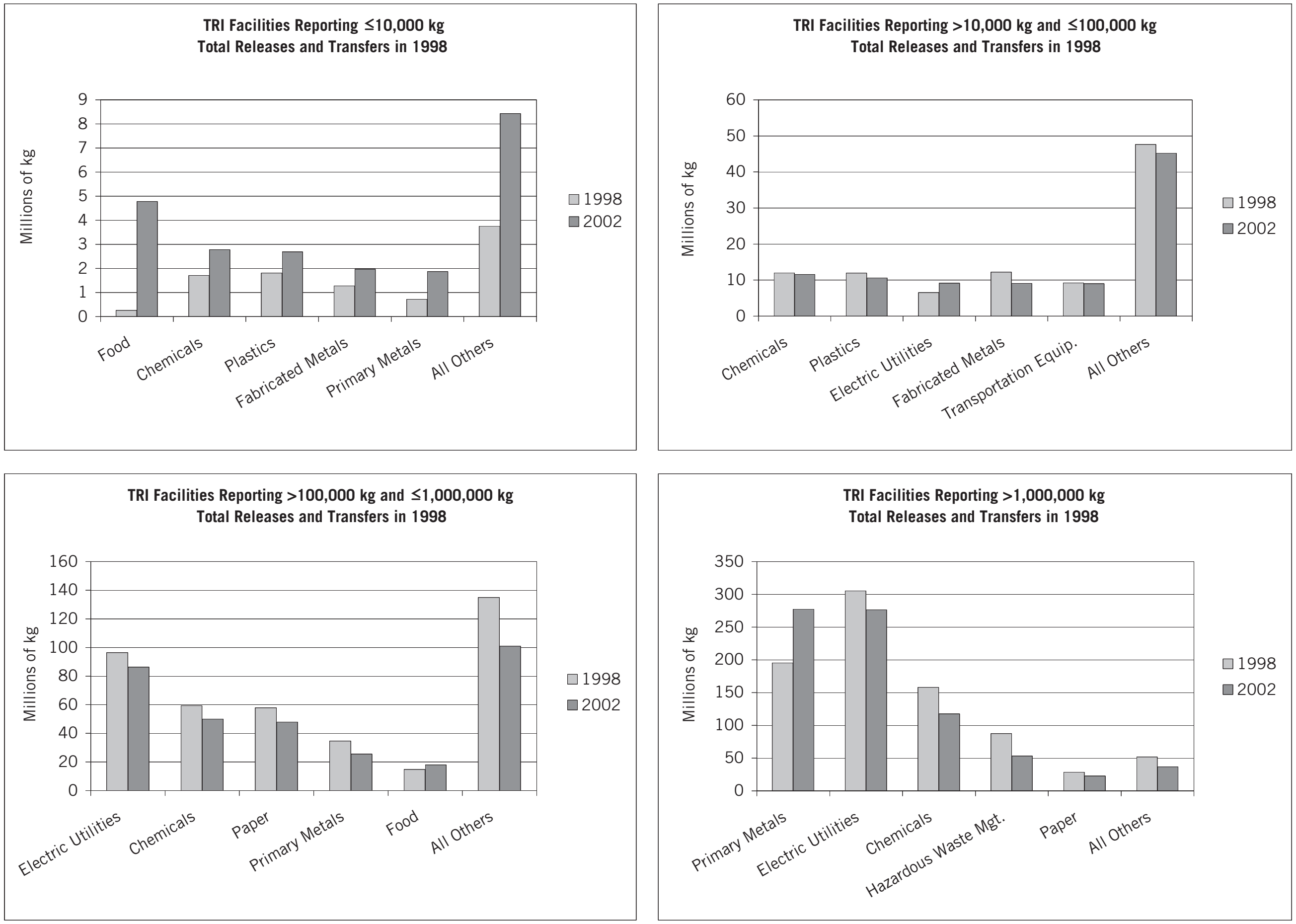


6.4.3 Releases On- and Off-site by Industry

This section analyzes the type of industry sector that is common in each group. There were notable differences between NPRI and TRI industry sectors.

- For the NPRI group of smaller reporters (those reporting 10,000 kg or less in 1998), the paper products sector represented 39 percent of total releases in 2002. The paper sector increased from 45,000 kg in 1998 to more than 1.5 million kg in 2002. Some facilities in the paper industry in NPRI indicated that they changed their method of estimating releases, resulting in increased estimates as well as increased production. (Generally, TRI paper facilities had made a similar change in their method of estimation during the 1994 reporting year.) The chemical manufacturing sector had the second-largest total releases for this group in NPRI, representing 14 percent of the total for 2002.
- The paper products sector was also the sector with the largest total releases for the medium-reporters group of facilities (reporting between 10,000 kg and 100,000 kg in 1998) and for the larger-reporters group (reporting 100,000 kg and 1,000,000 kg in 1998).
- Within the largest-reporters group, the primary metals sector reported the largest total releases, 41 percent of the total for this group in 2002.

Figure 6–7. Contribution of Top Industry Sectors to Total Releases On- and Off-site, 2002: TRI Facilites Reporting in Both Years Grouped by Amount of Total Releases and Transfers in 1998



- For TRI, the group of smaller reporters (those reporting 10,000 kg or less in 1998), the food industry had the largest total releases in 2002, representing 21 percent of the total for the group. Their releases were almost 20-times larger in 2002 than in 1998. Ten TRI facilities in this group had increases greater than 175,000 kg, primarily in discharges of nitric acid and nitrate compounds to surface waters.
- Chemical manufacturers were the sector with the largest total releases for the group of TRI medium reporters (with between 10,000 kg and 100,000 kg in 1998). The chemical sector showed a 4-percent decrease from 1998 to 2002 for this group. The plastics industry had the second-largest total releases in 2002 and also reported a decrease, of 11 percent. Increases in this group were reported by electric utilities (a 40-percent increase) and the food industry (a 98-percent increase).
- The electric utilities sector was the industry with the largest total releases within the group of larger reporters (between 100,000 kg and 1,000,000 kg in 1998), representing 26 percent of total releases of the TRI group of larger reporters in 2002. This group of electric utilities reported a decrease from 1998 to 2002 of 11 percent.
- The primary metals sector was the industry sector with the largest total releases for the largest reporters group of TRI facilities (reporting more than 1,000,000 kg in 1998). Total releases for this group of primary metal facilities increased by 42 percent, although one primary metals facility, BHP Copper N.A. San Manuel Ops. in San Manuel, Arizona, reported an increase of 108.9 million kg from 1998 to 2002. The facility reported that it had an increase in on-site land disposal due to discontinued operations related to mining. Without reporting by this one facility, this primary metals group would have shown a decrease of 14 percent and the electric utilities sector would have had the largest total releases.

6.4.4 Releases On- and Off-site by Industry for Facilities Reporting Smaller Amounts

For the group of North American facilities reporting smaller amounts (with total releases and transfers of 10,000 kg or less in 1998), 25 facilities reported an increase in total releases of more than 150,000 kg in matched chemicals from 1998 to 2002. Of these 25 facilities, 18 reported to TRI and 7 reported to NPRI.

- The facility from the first group, the smaller reporters, that reported the largest increase in total releases was the food industry facility Choctaw Maid Farms located in Carthage, Mississippi. It had an increase of over 870,000 kg, mainly as discharges to surface water of nitrate compounds.
- Two other TRI facilities from the food industry reported the next largest releases, also of nitrate compounds to surface waters.
- The NPRI facilities among the group of smaller reporters (those reporting less than 10,000 kg of total releases and transfers in 1998) with the largest increase in total releases from 1998 to 2002 were two paper products facilities. Both facilities reported mainly increases in air emissions of methanol. The Tembec Inc. facility located in Témiscaming, Quebec, reported an increase of over 380,000 kg, and the Western Pulp Limited Partnership owned by Doman Industries in Squamish, British Columbia, reported an increase of almost 348,000 kg. The facilities indicated they had switched to using the NCASI emissions estimating factors for methanol in 2000.

Table 6–12. North American Facilities with the Largest Increase in Total Releases On- and Off-site, 1998–2002: Facilities Reporting ≤10,000 kg in 1998

North American Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US
1	Choctaw Maid Farms Carthage Plant	Carthage, MS		20
2	Pilgrim's Pride Corp. Mt. Pleasant Complex	Mount Pleasant, TX		20
3	Wayne Farms L.L.C. Danville, Contigroup Cos.	Danville, AR		20
4	Union Electric Steel Corp., Ampco-Pittsburgh Corp.	Burgettstown, PA		35
5	Conagra Poultry Co., Conagra Foods Inc.	Farmerville, LA		20
6	Grede Foundries Inc.	Reedsburg, WI		33
7	Tembec Inc, Site de Témiscaming	Témiscaming, QC	27	26
8	Western Pulp Limited Partnership, Doman Industries	Squamish, BC	27	26
9	Cargill Corn Milling, Cargill Inc.	Eddyville, IA		Mult.
10	Bowater Produits Forestiers du Canada, Papeterie Dolbeau	Dolbeau-Mistassini, QC	27	26
11	Saint-Gobain Ceramic Materials Canada Inc, Chippawa	Niagara Falls, ON	35	32
12	Conagra Poultry Co. of Kentucky Inc., Conagra Foods Inc.	Hickory, KY		20
13	Sunpine Forest Products, Treating Plant, Weldwood of Canada	Sundre, AB	25	24
14	Conagra Poultry Co., Conagra Foods	Natchitoches, LA		20
15	Vonroll America Inc. WTI Final, Heritage-WTI L.L.C.	East Liverpool, OH		495/738
16	Cargill Inc.	Hammond, IN		20
17	Tyson Foods Inc.	Center, TX		20
18	ADM Corn Processing, Archer Daniels Midland Co.	Cedar Rapids, IA		Mult.
19	Roquette America Inc. Keokuk Plant	Keokuk, IA		Mult.
20	Wayne Farms L.L.C. Dobson, Contigroup Cos.	Dobson, NC		20
21	City of Vero Beach Municipal Utilities	Vero Beach, FL		491/493
22	Sorrento Lactalis Inc., Lactalis American Group Inc.	Nampa, ID		20
23	Abitibi-Consolidated Company of Canada, Kenora	Kenora, ON	27	26
24	Polybrite, Decoma International Inc.	Richmond Hill, ON	32	37
25	DTR Tennessee Inc.	Midway, TN		30

Table 6–12. (*continued*)

North American Rank	Forms 1998 Number	Forms 2002 Number	Total Releases On- and Off-site 1998 (kg)	Total Releases On- and Off-site 2002 (kg)	Total Releases On- and Off-site Change 1998–2002 (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of change at the facility)
1	1	2	0	871,725	871,725	Nitric acid and nitrate compounds (water)
2	1	2	91	736,890	736,800	Nitric acid and nitrate compounds (water)
3	5	5	5,904	456,680	450,776	Nitric acid and nitrate compounds (water)
4	3	3	1,361	431,418	430,058	Chromium (and its compounds) (transfers of metals)
5	1	1	0	390,096	390,096	Nitric acid and nitrate compounds (water)
6	7	8	6,557	395,773	389,216	Zinc/Nickel/Copper and compounds (transfers of metals)
7	2	8	3,053	383,363	380,310	Methanol (air), Manganese and compounds (land, water)
8	3	7	4,200	352,140	347,940	Methanol, Hydrochloric acid (air)
9	7	8	8,645	350,771	342,126	Nitric acid and nitrate compounds (transfers to disposal), Methanol (air)
10	1	4	0	321,175	321,175	Manganese and compounds (land)
11	1	2	180	304,974	304,794	Aluminum (fume or dust) (transfers of metals)
12	1	1	0	280,351	280,351	Nitric acid and nitrate compounds (water)
13	2	2	305	260,299	259,994	Copper and compounds (transfers of metals)
14	1	1	0	231,870	231,870	Nitric acid and nitrate compounds (water)
15	79	94	8,445	211,423	202,977	Chromium/Nickel/Copper/Zinc/Manganese and compounds (transfers of metals)
16	2	7	8,571	205,469	196,898	Asbestos (friable) (transfers to disposal), Propionaldehyde (air), Nitric acid and nitrate compounds (water), Acetaldehyde (air)
17	1	2	0	185,646	185,646	Nitric acid and nitrate compounds (water)
18	4	9	0	182,156	182,156	Acetaldehyde, Methanol (air)
19	3	5	615	179,864	179,249	Nitric acid and nitrate compounds (water), Hydrochloric acid (air)
20	1	2	2,980	179,951	176,971	Nitric acid and nitrate compounds (water)
21	1	2	0	173,464	173,464	Chlorine (land)
22	2	2	2	172,639	172,637	Nitric acid and nitrate compounds (land)
23	1	2	0	169,797	169,797	Methanol (air)
24	1	5	0	158,188	158,188	Chromium/Copper/Nickel and compounds (transfers of metals), Methyl ethyl ketone (air)
25	1	3	5,062	160,998	155,936	Toluene, Methyl isobutyl ketone, Xylenes (air)

6.4.5 Number of Employees and Number of Facilities Reporting Increases/Decreases by Group

The analysis in the previous sections focused on the overall changes from groups of facilities classified by the amount of total releases and transfers reported in 1998. The classification was based on amount of releases and transfers reported and not on the size of the facility because TRI does not report on the number of employees.

However, NPRI facilities do report the number of employees so it is possible to investigate whether the smaller reporting facilities are smaller also in terms of employees for NPRI. **Figure 6–8** shows the percent of facilities with fewer than 100 employees, between 100 and 1,000, and more than 1,000 employees that fall within each of the four groups selected in terms of reporting amounts.

- For NPRI, 58 percent of the facilities with fewer than 100 employees were also facilities that reported the smaller amount of total releases and transfers (10,000 kg or less in 1998). On the other hand, 55 percent of the facilities with more than 1,000 employees fell into the larger-reporters group (reported more than 100,000 kg but less than 1,000,000 kg in 1998).
- NPRI facilities employing more than 100 and fewer than 1,000 in 1998 were more evenly distributed among the four groups.

Figure 6–8. Percentage of Facilities Within the Group by Number of Employees at the NPRI Facility

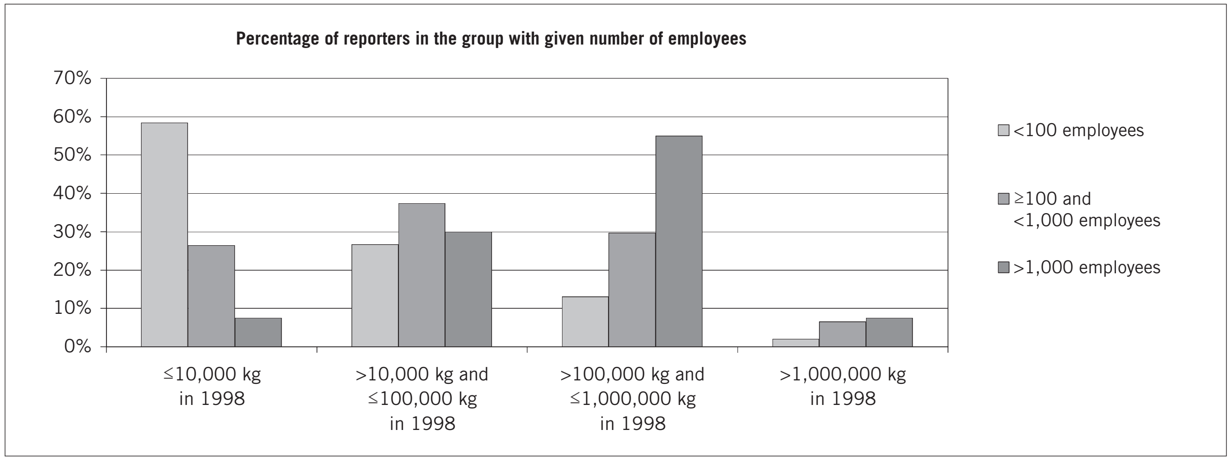
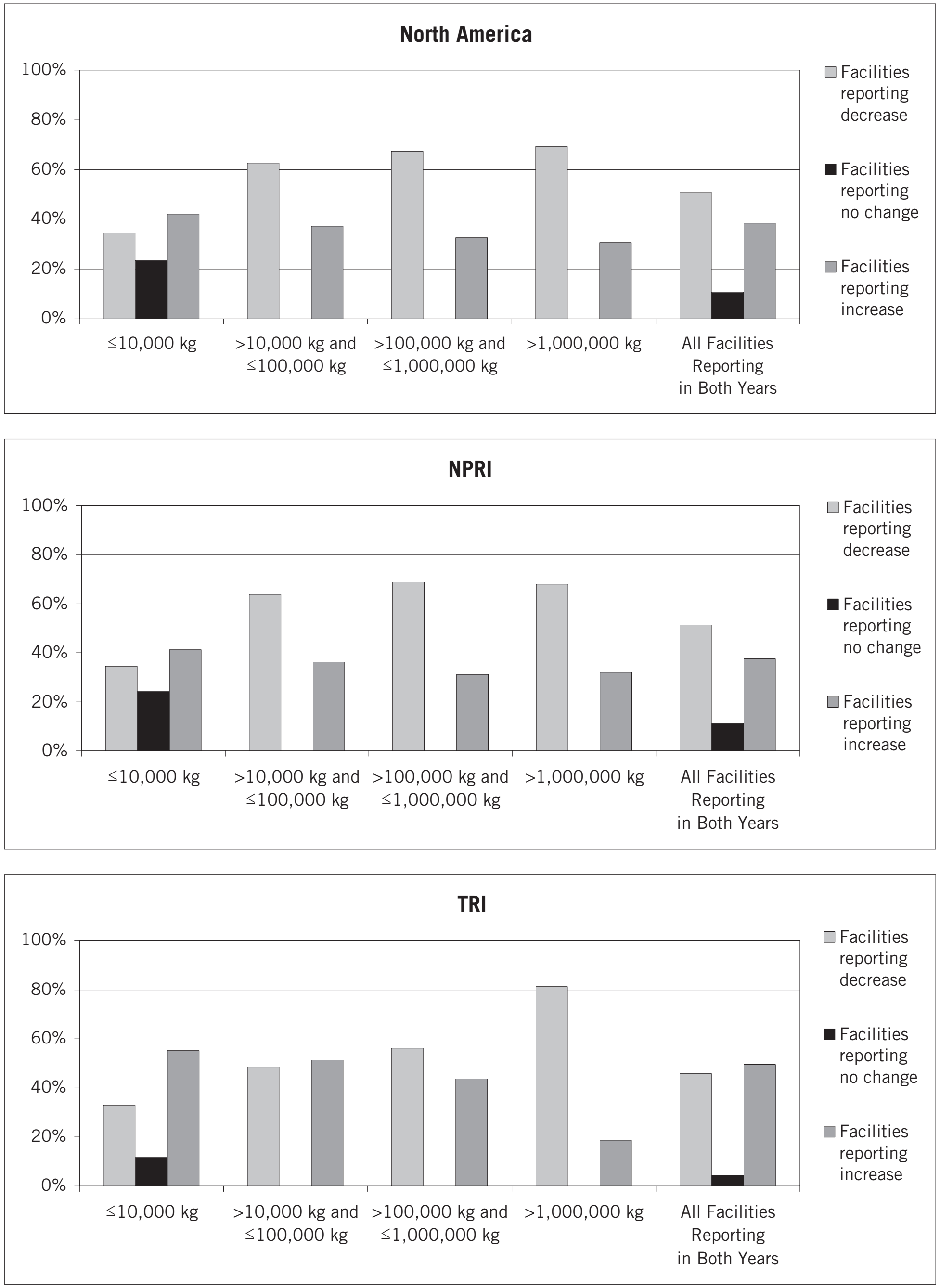


Figure 6–9. Percentage of Facilities Reporting Decrease, No Change, Increase in Total Reported Releases and Transfers, 1998–2002



Note: Canada and US data only. Mexico data not available for 1998–2002. Does not include facilities reporting only in 1998 or only in 2002 and does not include 31 facilities that reported less than 100,000 kg in 1998 and more than 1,000,000 kg in 2002.

Another question often asked is, "If the group as a whole showed an increase, does that mean all the facilities within the group reported increases?" While that is not the case, there is a prevalence of facilities reporting increases within those groups that had the highest increase. Overall, about half of the facilities reported decreases (51 percent) and half reported an increase or no change (49 percent).

- **Figure 6–9** shows that, for the first group, smaller reporters (10,000 kg or less in 1998), 65 percent reported either an increase or no change. The group as a whole had increases of over 300 percent in total releases and transfers (see **Table 6–9**).
- On the other hand, for the largest-reporters group (that reported more than 1,000,000 kg in 1998), which had a decrease of 10 percent overall in total releases and transfers (see **Table 6–9**), 69 percent reported a decrease.
- For the other two groups, the medium reporters and the larger reporters (facilities reporting more than 10,000 kg and reporting 1,000,000 kg or less in 1998), about two-thirds of the facilities reported decreases and one-third reported increases.

7

Releases and Transfers, 1995–2002

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Key Findings

- Releases and transfers from manufacturing facilities in North America decreased 7 percent from 1995 to 2002.
- Total releases on- and off-site decreased by 12 percent from 1995 to 2002. These releases represent on-site releases to air, water, land, or underground injection wells; and off-site releases, including off-site transfers to disposal and transfers of metals, to treatment, sewage, and disposal. On-site air releases decreased by 40 percent while surface water discharges increased by 7 percent and on-site land releases increased by 65 percent. This included an increase of more than 110 million kg from one facility. Without the reporting by this one facility, on-site land releases would have shown a decrease of 26 percent.
- NPRI manufacturing facilities reported a decrease of 15 percent in on-site releases and 14 percent in off-site releases, for a decrease in total releases of 15 percent. Total releases and transfers, which include transfers to sewage and treatment, decreased by 9 percent from 1995 to 2002.
- While TRI manufacturing facilities reported a 21-percent reduction in on-site releases, TRI off-site releases increased by 49 percent, resulting in an overall decrease of 12 percent in total releases. Total releases and transfers decreased by 7 percent from 1995 to 2002.
- Manufacturing facilities in the state of Texas had the largest releases and transfers as well as total releases in 1995 and the second-largest in 2002, despite a 19-percent reduction in total releases and transfers. The state of Arizona ranked first in 2002 up from 36th in 1995, primarily due to one primary metals facility, BHP Copper N.A. San Manuel Ops. in San Manuel, Arizona, that reported more than 87 percent of the state's total releases and transfers in 2002. The facility reported that it had an increase in on-site land disposal due to discontinued operations related to mining. The state of Indiana ranked third for total releases and transfers as well as total releases in 2002, up from tenth, with an increase of 54 percent. The province of Ontario ranked second in 1995 and fourth in 2002 for both total releases and transfers and total releases, with an 18-percent reduction in total releases and transfers.
- The manufacturing industries with the largest total releases and transfers in North America in 2002—primary metals, chemicals and paper products—were the same as in 1995. Primary metals, which ranked first in 2002 (up from second in 1995), reported a 36-percent increase from 1995 to 2002. Chemical manufacturing ranked second in 2002 and first in 1995, reporting an 18-percent decrease, while paper products, ranking third in both 1995 and 2002, had a 22-percent decrease.
- For NPRI, the paper products industry ranked first in 2002, up from third in 1995, with an increase of 1 percent, while the primary metals industry ranked first in 1995 and second in 2002, with a decrease of 34 percent. The chemical manufacturing industry went from second to third, with a decrease of 35 percent.
- For TRI, the primary metals industry ranked first in 2002, up from second in 1995, with an increase of 50 percent, while the chemical manufacturing industry went from first to second, with a decrease of 17 percent. The paper products industry ranked third in both years, with a decrease of 27 percent.

7.1 Introduction

This chapter examines changes in amounts of releases and transfers for further management between 1995 and 2002 from manufacturing industries. It analyzes data for industries and chemicals that reported in both the United States and Canada (the 1995 matched data set) for the years 1995 through 2002. Comparable Mexican data are not available for the 1995–2002 reporting years.

The data in this chapter include reporting on 153 chemicals from the manufacturing sectors (US SIC codes 20–39) and data for on-site releases and transfers to disposal, treatment, and sewage. This chapter does not include the TRI industries that began reporting only in 1998 (electric utilities, hazardous waste management/solvent recovery facilities, chemical wholesalers and coal mines). Nor does it include transfers to recycling and energy recovery, since required reporting of these data to NPRI began with the 1998 reporting year. Similarly, the new chemicals added to the NPRI list for 1999 and for later reporting years are excluded, as is mercury and its compounds since the reporting threshold was changed for the 2000 reporting year in both NPRI and TRI. Lead and its compounds are also excluded because TRI lowered the threshold for reporting for the 2001 reporting year (NPRI lowered the threshold for lead and its compounds for the 2002 reporting year). The data presented in this chapter are thus a subset of the 1998 and 2002 data presented in **Chapters 4**, **5**, and **6**.

7.2 1995–2002 Total Releases and Transfers from Manufacturing Industries in North America

The total amounts reported to the PRTR systems in Canada and the United States include releases on- and off-site, as well as off-site transfers for further management. On-site releases—to air, surface water, underground injection wells, and land—occur at the reporting facility site. Off-site releases consist of off-site transfers to disposal, including all transfers of metals to disposal, treatment, or sewage. Transfers of metals are included in the off-site releases category because metals in waste streams sent to treatment or sewage units are not destroyed and are ultimately released or disposed of. Transfers off-site for further management include transfers to treatment or sewage treatment plants of all chemicals in the matched data set that are not metals or their compounds.

- The number of facilities reporting in North America was 7 percent lower in 2002 than in 1995. The number of forms for North America decreased by 6 percent from 1995 to 2002.
- Total releases and transfers in North America decreased 7 percent from 1995 to 2002. After increasing from 1996 to 1997, total releases and transfers declined through 2001 and increased from 2001 to 2002.
- In North America, releases on- and off-site, which account for most of the total releases and transfers, fell in every year except from 1996 to 1997 and from 2001 to 2002; the overall reduction from 1995 to 2002 was 12 percent. On-site releases declined by 21 percent from 1995 to 2002.
- Not all types of on-site releases decreased, however. While air releases decreased by 40 percent, surface water discharges increased by 7 percent and on-site land releases increased by 65 percent. This included an increase of more than 110 million kg from one TRI

Table 7–1. Summary of Total Releases and Transfers in North America, 1995–2002

	North America									
	1995	1996	1997	1998	1999	2000	2001	2002	Change 1995–2002	
	Number	Number	Number	Number	Number	Number	Number	Number	Number	%
Total Facilities	20,564	20,382	20,365	20,416	20,220	20,210	19,576	19,049	-1,515	-7
Total Forms	61,388	60,384	60,829	61,079	60,969	61,213	58,907	57,779	-3,609	-6
Releases On- and Off-site	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**%**
On-site Releases*	**927,298,078**	**891,944,766**	**855,773,714**	**838,537,754**	**808,945,325**	**767,203,451**	**645,452,887**	**735,614,790**	**-191,683,288**	**-21**
Air	615,442,603	577,215,635	525,646,511	495,933,491	469,880,787	443,368,958	374,389,001	367,707,238	-247,735,366	-40
Surface Water	96,460,669	91,168,084	100,637,028	111,478,681	120,675,433	120,314,276	103,823,858	103,649,237	7,188,568	7
Underground Injection	94,577,185	83,563,144	80,494,834	75,707,097	70,620,606	73,803,551	60,629,586	64,939,682	-29,637,503	-31
Land	120,688,537	139,877,755	148,873,546	155,300,913	147,650,644	129,617,747	106,507,928	199,211,244	78,522,707	65
Off-site Releases	**153,787,326**	**169,215,373**	**299,655,852**	**208,006,075**	**212,799,977**	**220,560,231**	**216,587,770**	**212,572,446**	**58,785,121**	**38**
Transfers to Disposal (except metals)	21,585,268	17,211,368	23,329,111	23,829,039	28,820,205	30,706,005	26,413,381	19,035,605	-2,549,663	-12
Transfers of Metals**	132,202,058	152,004,005	276,326,741	184,177,037	183,979,772	189,854,226	190,174,389	193,536,842	61,334,784	46
Total Releases On- and Off-site	**1,081,085,403**	**1,061,160,139**	**1,155,429,566**	**1,046,543,830**	**1,021,745,302**	**987,763,682**	**862,040,657**	**948,187,236**	**-132,898,167**	**-12**
Off-site Transfers for Further Management	**209,591,110**	**211,888,359**	**235,180,859**	**238,636,896**	**230,731,761**	**239,824,311**	**245,441,871**	**252,242,614**	**42,651,504**	**20**
Treatment (except metals)	88,120,946	85,026,286	100,229,087	102,519,886	97,276,941	97,169,396	99,660,031	102,237,601	14,116,655	16
Sewage (except metals)	121,470,164	126,862,073	134,951,771	136,117,010	133,454,821	142,654,914	145,781,840	150,005,013	28,534,849	23
Total Releases and Transfers* **	**1,290,676,513**	**1,273,048,498**	**1,390,610,425**	**1,285,180,726**	**1,252,477,063**	**1,227,587,993**	**1,107,482,528**	**1,200,429,851**	**-90,246,663**	**-7**

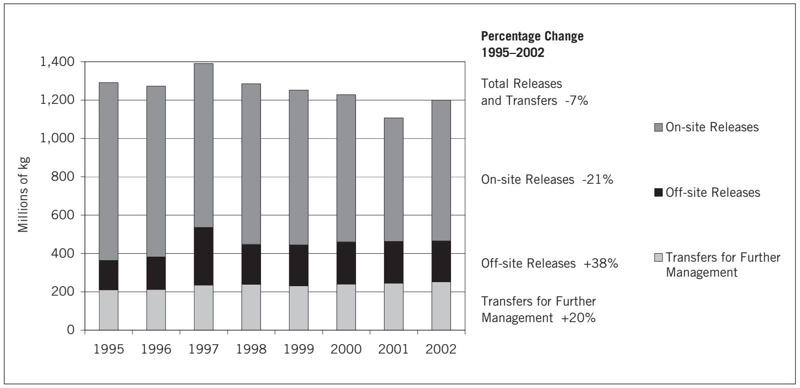
Note: Canada and US data only. Mexico data not available for 1995–2002. Data include 153 chemicals common to both NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data, in combination with other information, can be used as a starting point in evaluating exposures that may result from releases and other management activities which involve these chemicals.

* The sum of air, surface water, underground injection and land releases does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

** Includes transfers of metals and metal compounds to treatment, sewage and disposal.

*** Sum of releases on- and off-site and off-site transfers for further management.

Figure 7–1. Total Releases and Transfers in North America, 1995–2002



Note: Canada and US only. Mexico data not available for 1995–2002.

Figure 7–2. NPRI Total Releases and Transfers, 1995–2002

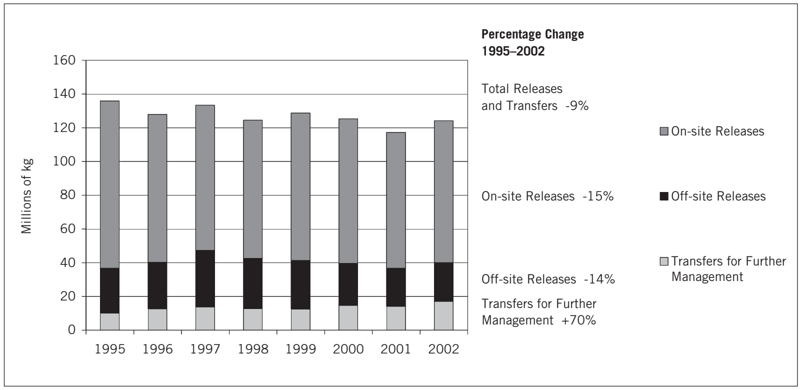
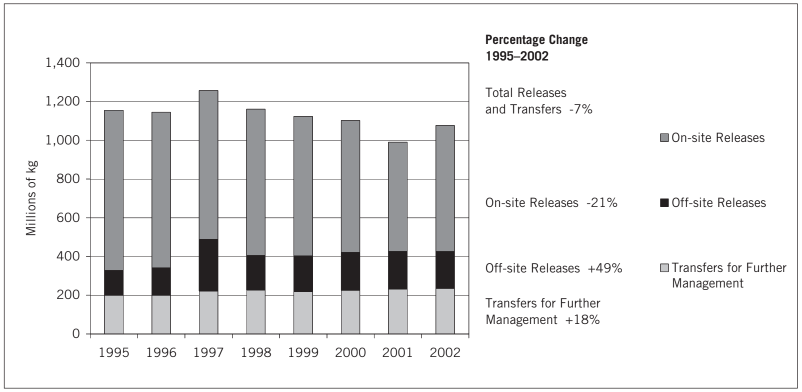


Figure 7–3. TRI Total Releases and Transfers, 1995–2002



facility. Without the reporting by this one facility, on-site land releases would have shown a decrease of 26 percent.

- Off-site releases increased by 38 percent from 1995 to 2002 in North America, but decreased by 2 percent in the most recent time period, 2001 to 2002.
- Transfers for further management also increased from 1995 to 2002 in North America. With the exception of 1998 to 1999, they rose in all years, including the latest, for an increase of 20 percent from 1995 to 2002.
- NPRI manufacturing facilities reported a decrease of 15 percent in on-site releases and 14 percent in off-site releases. Total releases and transfers decreased by 9 percent from 1995 to 2002.
- While TRI manufacturing facilities reported a 21-percent reduction in on-site releases, TRI off-site releases increased by 49 percent. Total releases and transfers decreased by 7 percent from 1995 to 2002.

7.2.1 1995–2002 Total Releases and Transfers by State and Province

Releases are on-site releases to air, water, underground injection, and land, plus off-site transfers to disposal and all transfers of metals. Transfers for further management are off-site transfers sent for treatment, including to sewage treatment plants, of all substances except metals. Transfers may be sent to nearby locations, out of the province or state, or out of the country. This analysis presents the data according to the originating states and provinces. Analysis based on the destination states and provinces is presented in **Chapter 8**.

- Manufacturing facilities in Texas reported the largest total releases and transfers as well as total releases in North America in 1995 and the second-largest in 2002, with a 19-percent reduction in total releases and transfers and a 31-percent reduction in total releases. Texas had the largest total transfers for further management in both years, with an increase of 20 percent.
- Arizona reported the largest total releases and transfers in 2002, up from 36th in 1995, primarily due to one primary metals facility, BHP Copper N.A. San Manuel Ops. in San Manuel, Arizona, that reported more than 87 percent of the state's total releases and transfers in 2002. The facility reported it had an increase in on-site land disposal due to discontinued operations related to mining.
- Indiana reported the third-largest total releases and transfers in North America in 2002, rising from tenth in 1995, with a 54-percent increase. The increase in total releases for this state from 1995 to 2002 was 53 percent, and in other transfers for further management it was 71 percent (totaling 2.8 million kg). Two facilities each reported increases of more than 1.5 million kg in transfers for further management.

Table 7–2. Change in Total Releases and Transfers in North America, by State and Province, 1995–2002

	Total Releases On- and Off-site					Total Off-site Transfers for Further Management				
	1995		2002		Change 1995–2002	1995		2002		Change 1995–2002
State/Province	kg	Rank	kg	Rank	(%)	kg	Rank	kg	Rank	(%)
Alabama	47,301,652	6	30,062,059	10	-36	3,980,778	18	4,475,509	22	12
Alaska	1,008,727	56	95,617	62	-91	14	60	1,131	60	8,215
Alberta	15,421,889	25	10,058,863	27	-35	694,544	37	2,120,390	29	205
Arizona	9,539,671	33	125,479,263	1	1,215	931,808	35	994,903	36	7
Arkansas	12,582,022	28	12,790,387	25	2	876,273	36	931,508	37	6
British Columbia	10,917,224	31	14,348,921	23	31	31,328	52	141,903	51	353
California	12,598,205	27	10,016,884	28	-20	10,101,020	5	9,419,435	8	-7
Colorado	1,618,683	51	2,960,726	45	83	671,271	38	1,581,665	34	136
Connecticut	4,667,415	43	1,789,729	46	-62	3,081,163	24	5,498,799	16	78
Delaware	3,263,187	48	3,066,479	44	-6	1,398,042	33	421,474	40	-70
District of Columbia	116	63	304	63	163	0	63	0	--	--
Florida	19,264,143	20	23,753,533	13	23	3,654,583	22	2,113,496	30	-42
Georgia	22,428,823	16	20,686,890	16	-8	2,214,766	29	3,361,080	27	52
Hawaii	220,342	61	109,617	61	-50	3,327	55	60	61	-98
Idaho	5,393,445	41	4,800,324	38	-11	167,446	49	345,685	41	106
Illinois	42,943,136	8	26,646,876	11	-38	7,224,215	7	7,289,327	10	1
Indiana	42,158,399	9	64,293,000	3	53	3,938,659	20	6,715,575	12	71
Iowa	11,625,518	29	11,084,141	26	-5	4,370,721	16	3,364,929	26	-23
Kansas	9,382,061	34	5,281,033	36	-44	1,207,211	34	22,516,269	2	1,765
Kentucky	15,736,080	24	14,632,969	22	-7	2,760,539	26	4,921,468	20	78
Louisiana	53,574,621	4	36,514,896	6	-32	2,304,042	27	9,971,466	6	333
Maine	4,526,224	44	3,850,053	41	-15	338,093	41	310,026	44	-8
Manitoba	1,621,078	50	4,056,134	40	150	205,419	46	235,104	47	14
Maryland	5,564,810	40	5,339,277	35	-4	2,247,651	28	2,071,470	31	-8
Massachusetts	3,712,854	47	1,375,760	48	-63	5,398,832	13	5,546,932	15	3
Michigan	41,371,094	10	35,819,307	7	-13	11,381,145	4	11,034,458	5	-3
Minnesota	8,236,485	36	5,804,190	34	-30	3,986,863	17	4,990,810	19	25
Mississippi	25,960,341	13	17,926,925	20	-31	1,860,394	31	1,352,008	35	-27
Missouri	22,053,618	17	20,008,107	18	-9	5,761,580	12	5,072,851	18	-12
Montana	17,462,648	23	1,337,069	50	-92	12,961	53	1,888	59	-85
Nebraska	5,339,836	42	14,874,999	21	179	164,643	50	220,152	49	34
Nevada	1,530,670	53	1,212,259	51	-21	652	59	23,526	57	3,507
New Brunswick	5,670,254	39	3,700,091	42	-35	1,010	56	24,724	56	2,348
New Hampshire	1,144,040	55	417,908	54	-63	259,110	42	279,096	45	8
New Jersey	7,728,494	37	5,268,455	37	-32	19,788,004	2	17,528,412	3	-11
New Mexico	18,061,686	21	362,822	56	-98	184,288	48	124,906	52	-32
New York	17,921,797	22	9,066,087	30	-49	4,984,961	14	4,206,150	23	-16
Newfoundland and Labrador	223,123	60	403,727	55	81	0	61	0	--	--
North Carolina	32,087,376	12	21,350,439	14	-33	6,215,015	10	2,691,381	28	-57
North Dakota	662,809	57	1,008,248	53	52	250,574	44	220,863	48	-12
Nova Scotia	1,582,997	52	1,767,864	47	12	6,261	54	55,481	54	786
Ohio	55,669,844	3	41,182,177	5	-26	12,097,950	3	11,232,252	4	-7
Oklahoma	8,543,453	35	6,372,386	31	-25	252,655	43	327,087	42	29
Ontario	62,695,535	2	47,478,502	4	-24	6,977,242	8	9,603,416	7	38
Oregon	11,421,333	30	9,576,654	29	-16	4,665,527	15	6,161,217	13	32
Pennsylvania	52,784,014	5	34,806,276	8	-34	8,836,291	6	5,614,789	14	-36
Prince Edward Island	10,220	62	223,437	59	2,086	0	62	250,549	46	--
Puerto Rico	3,782,978	46	1,080,289	52	-71	3,533,466	23	5,136,566	17	45
Quebec	21,017,207	18	20,769,178	15	-1	2,182,585	30	4,610,707	21	111
Rhode Island	1,307,796	54	305,498	57	-77	400,647	40	668,735	38	67
Saskatchewan	6,663,515	38	4,215,299	39	-37	765	57	78,357	53	10,143
South Carolina	23,818,778	15	25,201,911	12	6	3,976,062	19	3,716,794	25	-7
South Dakota	1,768,879	49	1,375,638	49	-22	201,910	47	164,867	50	-18
Tennessee	46,121,967	7	33,696,251	9	-27	3,905,740	21	1,803,679	33	-54
Texas	114,348,809	1	79,409,983	2	-31	32,093,888	1	38,631,837	1	20
Utah	34,283,093	11	20,052,653	17	-42	405,649	39	562,214	39	39
Vermont	311,908	59	128,722	60	-59	206,545	45	324,960	43	57
Virgin Islands	568,232	58	265,570	58	-53	68,098	51	33,512	55	-51
Virginia	24,627,672	14	19,402,467	19	-21	6,511,302	9	8,257,634	9	27
Washington	10,534,971	32	5,843,853	33	-45	1,424,806	32	1,958,257	32	37
West Virginia	12,952,293	26	5,990,526	32	-54	3,073,628	25	3,849,494	24	25
Wisconsin	19,687,537	19	14,172,335	24	-28	6,116,383	11	7,075,519	11	16
Wyoming	4,057,777	45	3,215,406	43	-21	764	58	3,863	58	406
Total	**1,081,085,403**		**948,187,236**		**-12**	**209,591,110**		**252,242,614**		**20**

Note: Canada and US data only. Mexico data not available for 1995–2002. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings are meant to imply that a facility, state or province is not meeting its legal requirements. The data do not predict levels of exposure of the public to those chemicals. Transfers are from facilities located in the state/province.

Table 7–2. (*continued*)

State/Province	Total Releases and Transfers 1995 kg	1995 Rank	2002 kg	2002 Rank	Change 1995–2002 (%)
Alabama	51,282,429	7	34,537,568	10	-33
Alaska	1,008,740	56	96,748	62	-90
Alberta	16,116,433	27	12,179,253	32	-24
Arizona	10,471,479	36	126,474,166	1	1,108
Arkansas	13,458,295	31	13,721,895	30	2
British Columbia	10,948,552	34	14,490,824	28	32
California	22,699,226	23	19,436,319	24	-14
Colorado	2,289,953	49	4,542,391	42	98
Connecticut	7,748,578	40	7,288,528	37	-6
Delaware	4,661,229	47	3,487,954	47	-25
District of Columbia	116	63	304	63	163
Florida	22,918,726	21	25,867,029	15	13
Georgia	24,643,589	19	24,047,969	18	-2
Hawaii	223,669	60	109,677	61	-51
Idaho	5,560,891	44	5,146,009	41	-7
Illinois	50,167,351	8	33,936,202	11	-32
Indiana	46,097,057	10	71,008,575	3	54
Iowa	15,996,239	30	14,449,070	29	-10
Kansas	10,589,272	35	27,797,301	13	163
Kentucky	18,496,619	24	19,554,436	23	6
Louisiana	55,878,663	5	46,486,362	7	-17
Maine	4,864,318	46	4,160,078	45	-14
Manitoba	1,826,497	51	4,291,238	44	135
Maryland	7,812,461	39	7,410,748	36	-5
Massachusetts	9,111,686	37	6,922,692	38	-24
Michigan	52,752,239	6	46,853,765	6	-11
Minnesota	12,223,349	32	10,795,000	33	-12
Mississippi	27,820,735	14	19,278,932	25	-31
Missouri	27,815,198	15	25,080,958	17	-10
Montana	17,475,609	26	1,338,957	51	-92
Nebraska	5,504,479	45	15,095,151	27	174
Nevada	1,531,322	54	1,235,785	52	-19
New Brunswick	5,671,264	43	3,724,815	46	-34
New Hampshire	1,403,151	55	697,004	55	-50
New Jersey	27,516,498	17	22,796,867	20	-17
New Mexico	18,245,974	25	487,728	56	-97
New York	22,906,759	22	13,272,237	31	-42
Newfoundland and Labrador	223,123	61	403,727	59	81
North Carolina	38,302,391	11	24,041,820	19	-37
North Dakota	913,383	57	1,229,111	53	35
Nova Scotia	1,589,258	53	1,823,345	49	15
Ohio	67,767,795	3	52,414,428	5	-23
Oklahoma	8,796,108	38	6,699,472	39	-24
Ontario	69,672,777	2	57,081,918	4	-18
Oregon	16,086,860	28	15,737,871	26	-2
Pennsylvania	61,620,305	4	40,421,065	8	-34
Prince Edward Island	10,220	62	473,986	57	4,538
Puerto Rico	7,316,444	41	6,216,854	40	-15
Quebec	23,199,792	20	25,379,885	16	9
Rhode Island	1,708,444	52	974,232	54	-43
Saskatchewan	6,664,280	42	4,293,656	43	-36
South Carolina	27,794,840	16	28,918,705	12	4
South Dakota	1,970,789	50	1,540,505	50	-22
Tennessee	50,027,707	9	35,499,930	9	-29
Texas	146,442,697	1	118,041,820	2	-19
Utah	34,688,741	12	20,614,867	22	-41
Vermont	518,453	59	453,682	58	-12
Virgin Islands	636,329	58	299,083	60	-53
Virginia	31,138,974	13	27,660,101	14	-11
Washington	11,959,777	33	7,802,109	35	-35
West Virginia	16,025,921	29	9,840,019	34	-39
Wisconsin	25,803,920	18	21,247,854	21	-18
Wyoming	4,058,541	48	3,219,269	48	-21
Total	**1,290,676,513**		**1,200,429,851**		**-7**

- Ontario reported the second-largest releases and transfers in North America in 1995 and the fourth-largest in 2002; the amount decreased by 18 percent. Ontario had the second-largest total releases in 1995 and the fourth-largest in 2002, with a decrease of 24 percent. Transfers for further management in Ontario increased by 38 percent between 1995 and 2002.

7.2.2 1995–2002 Total Releases and Transfers by Industry

Data comparing 1995 with 2002 include only the manufacturing sectors (US SIC codes 20–39) because they are the only sectors for which both TRI and NPRI data are available for this period. Information on releases and transfers from the other industry sectors was included in data presented in previous chapters.

- Of the 21 manufacturing industry sectors in the matched data set, 16 reported decreases in total releases and transfers from 1995 to 2002.
- In 2002, the primary metals sector had the largest releases and transfers in North America of any manufacturing industry. It had ranked second in 1995 and reported a 36-percent increase (an increase of 99.3 million kg). One primary metals facility, BHP Copper N.A. San Manuel Ops. in San Manuel, Arizona, reported an increase of 110.6 million kg in total releases and transfers. The facility reported it had an increase in on-site land disposal due to discontinued operations related to mining. Without reporting by this one facility, the primary metals sector would have shown a decrease of 4 percent.
- Chemical manufacturing ranked first in total releases and transfers in 1995 but second in 2002, with an 18-percent decrease. The industry had the largest transfers for further management in both years; the amount rose 34 percent from 1995 to 2002.
- Paper products ranked third in both years in total releases and transfers, but the reported amount fell 22 percent from 1995 to 2002. The industry's total releases fell by 22 percent, and total transfers for further management also fell by 22 percent.

Table 7–3. Change in Total Releases and Transfers in North America, by Industry, 1995–2002 (Ordered by Total Releases and Transfers, 2002)

		Total Releases On- and Off-site					Total Off-site Transfers for Further Management				
		1995		2002		Change 1995–2002	1995		2002		Change 1995–2002
US SIC Code	Industry	kg	Rank	kg	Rank	(%)	kg	Rank	kg	Rank	(%)
33	Primary Metals	262,836,412	2	363,057,755	1	38	9,569,708	6	8,697,399	6	-9
28	Chemicals	317,124,714	1	198,215,643	2	-37	118,179,555	1	158,534,600	1	34
26	Paper Products	131,580,087	3	102,902,020	3	-22	22,603,008	2	17,524,945	2	-22
20	Food Products	22,347,225	9	45,347,115	4	103	10,968,623	4	17,217,402	3	57
--	Multiple codes 20–39*	61,094,330	4	36,072,603	7	-41	13,814,200	3	14,705,100	4	6
37	Transportation Equipment	53,980,211	6	37,028,698	6	-31	4,239,466	8	4,671,918	8	10
30	Rubber and Plastics Products	55,622,808	5	37,382,879	5	-33	2,763,492	9	2,424,857	10	-12
29	Petroleum and Coal Products	28,083,990	8	31,883,781	8	14	2,104,791	10	3,946,909	9	88
34	Fabricated Metals Products	39,470,683	7	25,278,259	9	-36	7,631,676	7	10,212,077	5	34
24	Lumber and Wood Products	15,368,611	11	18,789,600	10	22	233,923	18	275,691	18	18
32	Stone/Clay/Glass Products	12,165,533	14	15,931,455	11	31	1,273,548	13	1,402,674	11	10
36	Electronic/Electrical Equipment	15,122,490	12	6,344,644	13	-58	9,860,775	5	8,014,104	7	-19
27	Printing and Publishing	14,318,794	13	8,898,023	12	-38	494,677	16	948,153	13	92
35	Industrial Machinery	10,418,660	15	5,334,452	14	-49	1,762,067	12	790,673	15	-55
39	Misc. Manufacturing Industries	6,020,470	18	4,670,967	15	-22	856,664	15	914,513	14	7
25	Furniture and Fixtures	18,559,986	10	4,302,887	16	-77	368,981	17	478,985	16	30
38	Measurement/Photographic Instruments	6,384,379	17	2,639,287	18	-59	1,893,829	11	1,140,751	12	-40
22	Textile Mill Products	8,049,886	16	2,809,000	17	-65	902,832	14	277,083	17	-69
31	Leather Products	1,562,527	19	707,064	19	-55	31,107	20	55,178	19	77
21	Tobacco Products	516,488	20	459,872	20	-11	102	21	571	21	462
23	Apparel and Other Textile Products	457,122	21	131,233	21	-71	38,084	19	9,033	20	-76
	Total	**1,081,085,403**		**948,187,236**		**-12**	**209,591,110**		**252,242,614**		**20**

Note: Canada and US data only. Mexico data not available for 1995–2002.
* Multiple SIC codes reported only in TRI.

Figure 7–4. Change in NPRI Total Releases and Transfers, by Industry with Largest Total Releases and Transfers in 2002, 1995–2002

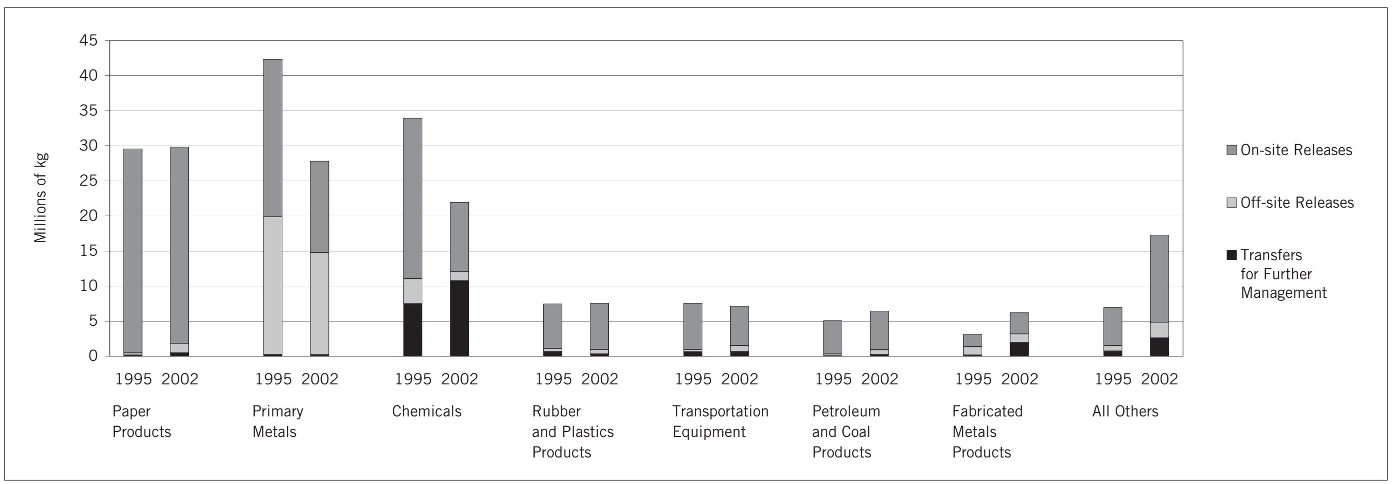
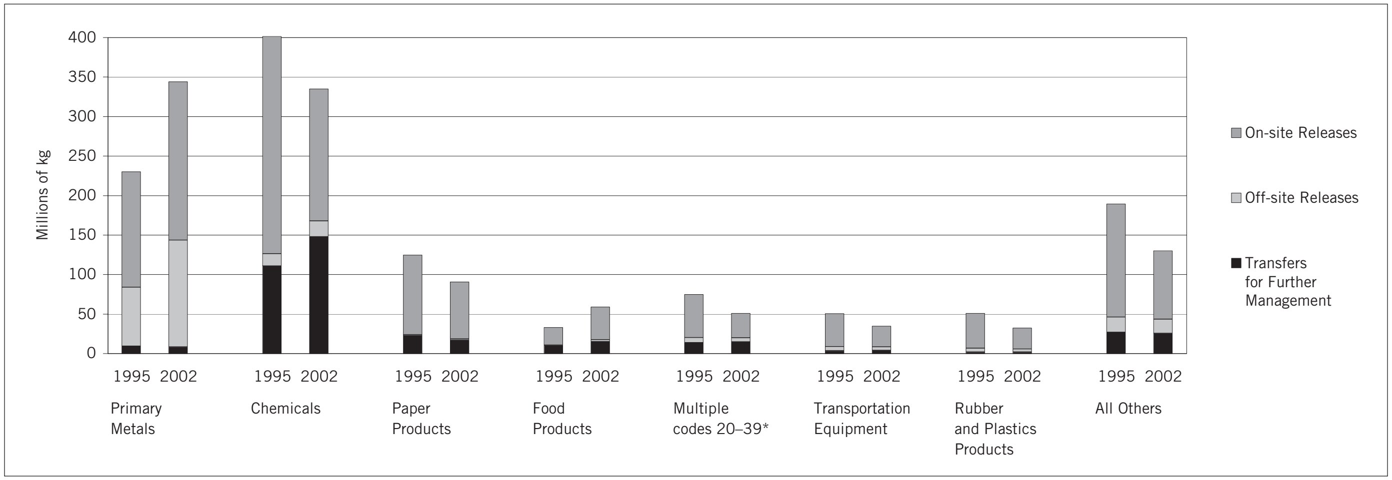


Table 7–3. (*continued*)

US SIC Code	Industry	Total Releases and Transfers 1995 kg	1995 Rank	2002 kg	2002 Rank	Change 1995–2002 (%)
33	Primary Metals	272,406,120	2	371,755,153	1	36
28	Chemicals	435,304,269	1	356,750,243	2	-18
26	Paper Products	154,183,095	3	120,426,965	3	-22
20	Food Products	33,315,848	8	62,564,517	4	88
--	Multiple codes 20–39*	74,908,530	4	50,777,702	5	-32
37	Transportation Equipment	58,219,677	6	41,700,615	6	-28
30	Rubber and Plastics Products	58,386,299	5	39,807,736	7	-32
29	Petroleum and Coal Products	30,188,781	9	35,830,690	8	19
34	Fabricated Metals Products	47,102,359	7	35,490,336	9	-25
24	Lumber and Wood Products	15,602,534	12	19,065,291	10	22
32	Stone/Clay/Glass Products	13,439,081	14	17,334,129	11	29
36	Electronic/Electrical Equipment	24,983,265	10	14,358,748	12	-43
27	Printing and Publishing	14,813,471	13	9,846,176	13	-34
35	Industrial Machinery	12,180,727	15	6,125,125	14	-50
39	Misc. Manufacturing Industries	6,877,134	18	5,585,479	15	-19
25	Furniture and Fixtures	18,928,967	11	4,781,872	16	-75
38	Measurement/Photographic Instruments	8,278,208	17	3,780,038	17	-54
22	Textile Mill Products	8,952,719	16	3,086,083	18	-66
31	Leather Products	1,593,634	19	762,243	19	-52
21	Tobacco Products	516,589	20	460,442	20	-11
23	Apparel and Other Textile Products	495,206	21	140,266	21	-72
	Total	**1,290,676,513**		**1,200,429,851**		**-7**

* Multiple SIC codes reported only in TRI.

Figure 7–5. Change in TRI Total Releases and Transfers, by Industry with Largest Total Releases and Transfers in 2002, 1995–2002



* Multiple SIC codes reported only in TRI.

- For NPRI, the paper products industry reported the largest total releases and transfers in 2002, up from third in 1995. The total increased by 1 percent, due to an increase in off-site releases and other transfers for further management. On-site releases from the NPRI paper products industry showed a decrease of 4 percent.
- NPRI primary metals industry ranked second in 2002 and first in 1995 for total releases and transfers, with a 34-percent decrease.
- NPRI chemical industry releases and transfers dropped by 35 percent, and this industry ranked second in 1995 and third in 2002. On-site releases fell by 57 percent, although other off-site transfers for further management rose by 44 percent from 1995 to 2002.
- The TRI primary metals sector ranked first in 2002, with an increase of 50 percent (or 113.9 million kg). One primary metals facility, BHP Copper N.A. San Manuel Ops. in San Manuel, Arizona, reported an increase of 110.6 million kg in total releases and transfers. The facility reported an increase in on-site land disposal due to discontinued operations related to mining.
- The TRI chemical manufacturing industry ranked first in 1995 and second in 2002, with a decrease of 17 percent. On-site releases decreased by 39 percent but off-site releases and other off-site transfers for further management increased.

7.2.3 Facilities with Largest Change in Total Releases On- and Off-site, NPRI and TRI, 1995–2002

- The largest decrease in total releases reported by an NPRI facility was the 6.3 million kg reported by the primary metals facility Gerdau AmeriSteel in Whitby, Ontario. This facility reduced its transfers of zinc and its compounds sent for disposal. Some of this decrease was due to sending this material for recycling instead of disposal.
- The NPRI facility with the second-largest decrease was the chemical manufacturing plant of the Methanex Corporation in Medicine Hat, Alberta, which reported 3.4 million kg of methanol released to the air in 1995 but did not report on methanol in 2002. The company reported that the plant had been mothballed in 2001 for an indefinite period.
- Four of the other 10 NPRI facilities with the largest decreases were also chemical manufacturing facilities. A total of three were primary metals facilities, and two were paper products facilities.

Table 7–4. The NPRI Facilities with the Largest Change in Total Releases On- and Off-site, 1995–2002

North American Rank	NPRI Rank	Facility	City, Province	SIC Codes Canada	SIC Codes US
Largest Decrease					
7	1	Gerdau AmeriSteel, Whitby	Whitby, ON	29	33
18	2	Methanex Corporation, Medicine Hat Plant	Medicine Hat, AB	37	28
24	3	Celanese Canada Inc., Edmonton Facility	Edmonton, AB	37	28
26	4	Irving Pulp & Paper Limited / Irving Tissue Company, J.D. Irving Limited	Saint John, NB	27	26
27	5	IPSCO Saskatchewan Inc., Regina Plant Site, IPSCO Inc.	Regina, SK	29	33
29	6	Sherritt International Corporation, Fort Saskatchewan	Fort Saskatchewan, AB	37	28
31	7	Nexen Chemicals Canada Limited Partnership, Nexen Inc.	Nanaimo, BC	37	28
32	8	Emballages Smurfit-Stone Canada Inc., Usine de La Tuque, Smurfit-Stone Container Corporation	La Tuque, QC	27	26
39	9	NOVA Chemicals Corporation, St. Clair River Site	Corunna, ON	37	28
45	10	Dominion Castings Ltd., ABC NACO Inc.	Hamilton, ON	29	33
Largest Increase					
40	1	Norske Skog Canada Limited, Crofton Division	Crofton, BC	27	26
48	2	Ispat Sidbec Inc., Acierie, Ispat International Ltd.	Contrecœur, QC	29	33
51	3	Tolko Manitoba Kraft Papers, Tolko Industries Ltd.	The Pas, MB	27	26
70	4	Eurocan Pulp and Paper Company, West Fraser Mills	Kitimat, BC	27	26
71	5	Cargill Foods, Cargill High River Plant, Cargill Inc.	High River, AB	10	20
73	6	Stora Enso, Stora Enso Port Hawkesbury Limited	Port Hawkesbury, NS	27	26
85	7	Canfor - Prince George Pulp and Paper Mills, Canadian Forest Products Ltd.	Prince George, BC	27	26
87	8	Cariboo Pulp and Paper Co., Daishowa Marubeni International Inc./Weldwood of Canada	Quesnel, BC	27	26
89	9	Imperial Oil, Sarnia Refinery Plant	Sarnia, ON	36	29
99	10	Canadian Forest Products Ltd., Northwood Pulp Mill	Prince George, BC	27	26

Table 7–4. (*continued*)

NPRI Rank	Forms 1995 Number	Forms 2002 Number	Total Releases On- and Off-site 1995 (kg)	2002 (kg)	Change 1995–2002 (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of change at the facility)
Largest Decrease						
1	4	5	7,534,652	1,239,451	-6,295,201	Zinc and compounds (transfers of metals to disposal)
2	4	*	3,353,220	*	-3,353,220	Methanol (air)
3	10	10	3,532,829	446,773	-3,086,056	Methanol (UIJ)
4	4	10	3,663,623	765,569	-2,898,054	Methanol (water)
5	10	8	5,646,508	3,017,684	-2,628,824	Zinc and compounds (land)
6	13	3	2,291,434	6,936	-2,284,498	Methanol (air)
7	2	3	1,988,244	384	-1,987,860	Asbestos (transfers to disposal)
8	3	8	2,408,582	480,776	-1,927,806	Methanol (water)
9	9	5	2,181,830	513,070	-1,668,760	Cyclohexane (air)
10	3	*	1,487,191	*	-1,487,191	Chromium and compounds (transfers of metals to disposal)
Largest Increase						
1	4	8	30,000	1,454,191	1,424,191	Hydrochloric acid, Methanol (air)
2	4	4	1,321,337	2,516,746	1,195,409	Zinc and compounds (land)
3	1	7	400	1,157,525	1,157,125	Methanol (air)
4	3	6	3,500	800,482	796,982	Methanol (air)
5	*	2	*	796,542	796,542	Nitric acid and nitrate compounds (water)
6	5	3	198,717	970,316	771,599	Methanol (air)
7	4	10	469,600	1,091,977	622,377	Manganese and compounds (land), Methanol (air)
8	4	5	284,720	901,295	616,575	Methanol (air)
9	21	23	527,416	1,114,754	587,338	Sulfuric acid (air)
10	4	10	211,500	698,910	487,410	Methanol (air)

* Facility did not report matched chemicals in year indicated.
UIJ = underground injection.

- The NPRI facility with the largest increase in total releases was a paper products facility, Norske Skog Canada Limited, in Crofton, British Columbia. This facility reported an increase of 1.4 million kg, primarily of hydrochloric acid and methanol released to the air.
- Six other paper products facilities, four of which were also located in British Columbia, were among the 10 NPRI facilities with the largest increases. They explained their increases as due to increases in production levels and to the updated estimation methods developed by NCASI (National Council of the Paper Industry for Air and Stream Improvement).
- The facility with the second-largest increase was the primary metals facility Ispat Sidbec Inc. in Contrecoeur, Quebec. It had an increase of 1.2 million kg, mainly as on-site land disposal of zinc and its compounds.

- Among the ten TRI facilities with the largest decreases in total releases, the largest decrease was posted by a primary metals facility located in Utah. US Magnesium in Rowley, Utah, reported a decrease of 22.5 million kg, mainly in on-site air releases of chlorine.
- Four other primary metals facilities were also among these ten. The other five facilities were all chemical manufacturers.

Table 7–5. The TRI Facilities with the Largest Change in Total Releases On- and Off-site, 1995–2002

North American Rank	TRI Rank	Facility	City, State	US SIC Code
Largest Decrease				
1	1	US Magnesium L.L.C., Renco Group Inc.	Rowley, UT	33
2	2	ASARCO Inc., Americas Mining Corp.	East Helena, MT	33
3	3	Acordis Cellulosic Fibres Inc., Acordis U.S. Holding Inc.	Axis, AL	28
4	4	Phelps Dodge Hidalgo Inc., Phelps Dodge Corp.	Playas, NM	33
5	5	Cytec Inds. Inc. Fortier Plant	Westwego, LA	28
6	6	Northwestern Steel & Wire Co.	Sterling, IL	33
7	7	GM Powertrain Defiance, General Motors Corp.	Defiance, OH	33
8	8	DuPont Victoria Plant	Victoria, TX	28
9	9	Celanese Ltd. Clear Lake Plant, Celanese Americas Corp.	Pasadena, TX	28
10	10	Sterling Chemicals Inc.	Texas City, TX	28
Largest Increase				
1	1	BHP Copper N.A. San Manuel Ops.	San Manuel, AZ	33
2	2	Steel Dynamics Inc.	Butler, IN	33
3	3	AK Steel Corp. (Rockport Works)	Rockport, IN	33
4	4	Solutia - Chocolate Bayou	Alvin, TX	28
5	5	Nucor Steel, Nucor Corp.	Huger, SC	33
6	6	Nucor Steel, Nucor Corp.	Crawfordsville, IN	33
7	7	ASARCO Inc. Ray Complex Hayden Smelter & Concentrator, Americas Mining Corp.	Hayden, AZ	33
8	8	National Steel Corp. Greatlakes Ops.	Ecorse, MI	33
9	9	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT	33
10	10	Nucor Steel Nebraska, Nucor Corp.	Norfolk, NE	33

Table 7–5. (*continued*)

TRI Rank	Forms 1995 Number	Forms 2002 Number	Total Releases On- and Off-site 1995 (kg)	Total Releases On- and Off-site 2002 (kg)	Change 1995–2002 (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of change at the facility)
Largest Decrease						
1	5	3	29,168,744	6,699,791	-22,468,952	Chlorine (air)
2	7	*	15,993,319	*	-15,993,319	Zinc and compounds (land)
3	4	*	15,427,755	*	-15,427,755	Carbon disulfide (air)
4	8	*	13,970,022	*	-13,970,022	Zinc/Copper and compounds (land)
5	21	21	11,718,166	2,938,713	-8,779,453	Acetonitrile, Acrylic acid (UIJ)
6	7	*	7,093,997	*	-7,093,997	Zinc/Manganese and compounds (land)
7	15	13	6,446,644	750,810	-5,695,834	Zinc and compounds (land)
8	28	28	10,066,351	4,383,194	-5,683,158	Nitric acid and nitrate compounds (UIJ)
9	21	17	6,211,230	535,352	-5,675,879	Ethylene glycol, Methanol, Vinyl acetate, Ethylene oxide, Acetaldehyde, Formaldehyde (UIJ), Methyl iodide (transfers to disposal, UIJ), Xylenes, Propylene (air)
10	36	33	5,408,263	386,366	-5,021,898	Nitric acid and nitrate compounds, Acetonitrile, Methanol (UIJ)
Largest Increase						
1	8	5	182,449	110,611,077	110,428,628	Copper/Manganese and compounds (land)
2	1	13	6,117	10,534,380	10,528,263	Zinc and compounds (transfers of metals)
3	*	6	*	9,671,796	9,671,796	Nitric acid and nitrate compounds (water)
4	*	21	*	7,624,696	7,624,696	Acrylonitrile, Acrylic acid (UIJ)
5	*	6	*	7,497,353	7,497,353	Zinc and compounds (transfers of metals)
6	7	6	5,090,856	12,242,084	7,151,229	Zinc and compounds (transfers of metals)
7	6	10	7,310,954	14,042,463	6,731,510	Copper/Zinc and compounds (land)
8	15	19	6,190,778	12,567,895	6,377,117	Zinc and compounds (transfers of metals)
9	11	14	2,150,252	8,397,304	6,247,052	Copper and compounds (land)
10	5	6	1,186	4,635,990	4,634,804	Zinc/Manganese and compounds (transfers of metals)

* Facility did not report matched chemicals in year indicated.
UIJ = underground injection.

- All but one of the 10 TRI facilities with the largest increases from 1995 to 2002 were primary metals facilities. The largest increase among them was reported by the BHP Copper facility in San Manuel, Arizona, with an increase of 110.4 million kg, mainly on-site land disposal of copper and manganese and their compounds. The facility indicated that the increase was due to discontinued operations related to mining.
- The only other type of facility among the top 10 TRI facilities reporting largest increases was a chemical manufacturer.

8

Off-site Transfers Within Country and Cross-Border

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Key Findings

- NPRI facilities transferred off-site 230.9 million kg of matched chemicals in 2002 and sent 15 percent (34.0 million kg) of the matched chemicals to US locations.
- TRI facilities transferred off-site 1.59 billion kg in 2002 and sent 1 percent (16.7 million kg) of the matched chemicals to Canadian locations and 2 percent (38.3 million kg) to Mexican locations in 2002.
- Mexico has not begun to collect mandatory data on transfers so it is not known how much was transferred to the United States or Canada from Mexico.
- Of the Canadian transfers to US sites, 83 percent were for recycling. Of the US transfers to Canadian sites, 59 percent were for recycling and 20 percent were for energy recovery. US transfers to Mexican sites were mainly metals for recycling.
- Most cross-border transfers were received at sites in Pennsylvania and Michigan in the United States and in Ontario and Quebec in Canada.
- A relatively small number of facilities in each country sent transfers across the US-Canada border—285 TRI facilities and 163 NPRI facilities. Two TRI facilities and eight NPRI facilities each reported one million kg or more of cross-border transfers in 2002.
- Arizona (with 129.6 million kg), Ohio (with 119.0 million kg), Texas (with 97.1 million kg) and Indiana (with 85.8 million kg) had the largest "loadings" within their states. Pennsylvania came next, with 74.1 million kg, and then Ontario, with 68.8 million kg. The term "loadings" refers to the releases that occur within the boundaries of a state or province. It includes all on-site releases from facilities located within the state or province as well as off-site transfers to disposal (off-site releases) received by sites within that state or province, whether from across state/provincial lines or from facilities within the state/province.
- Cross-border transfers from Canada to the United States increased by 25 percent (6.5 million kg) between 1998 and 2002. Total transfers within Canada increased by 5 percent (7.9 million kg).
- The sector with the largest transfers from Canadian facilities to US sites in both 1998 and 2002 was the primary metals industry, mainly sending transfers for recycling. Hazardous waste management/solvent recovery facilities in Canada accounted for the largest transfers other than for recycling to US sites in 2002, due mainly to one facility sending transfers for energy recovery. This industry decreased transfers to energy recovery and treatment by 12 percent and to disposal by 14 percent from 1998 to 2002.
- Cross-border transfers from the United States to Canada decreased by 44 percent (11.4 million kg) between 1998 and 2002. Total transfers within the United States decreased by 5 percent (75.4 million kg).
- The sector with the largest transfers from US facilities to Canadian sites in 1998 was the primary metals industry, mainly sending transfers for recycling. This industry decreased its transfers for recycling by 76 percent from 1998 to 2002. US hazardous waste facilities reported the largest transfers to disposal and transfers to energy recovery and treatment in 1998 to Canadian sites. Both types of transfers from these facilities had decreased, by 99.5 percent or more, by 2002.

8.1 Introduction

NPRI and TRI facilities report the amounts of chemicals they transfer to off-site locations, along with the address of the off-site location. Off-site transfers are those from a facility to other locations—nearby, within the state or province, or outside the country. Most transfers occur to sites within a nation's borders. However, matched chemicals can also be shipped to a North American neighbor or to another country. This chapter examines off-site transfers including those sent to sites across national boundaries from 1998 to 2002. The off-site transfers examined are transfers to recycling, energy recovery, treatment, and disposal. Off-site transfers to sewage are not included because they are sent to local sewage treatment plants.

This chapter presents:

- 2002 data for transfers to disposal, recycling, energy recovery, and treatment based on 203 chemicals; and
- data for the time period from 1998 to 2002, based on 153 chemicals.

The information for 1998 to 2002 includes data on 153 chemicals that NPRI and TRI reported in common during that time span. It does not include the new chemicals added to NPRI since 1998, nor does it include mercury and its compounds, because the reporting threshold for that group of substances was lowered for both NPRI and TRI beginning with the 2000 reporting year. Lead and its compounds are also excluded because TRI lowered the threshold for reporting for the 2001 reporting year (NPRI lowered the lead and its compounds threshold for the 2002 reporting year). No data for prior years are included because NPRI reporting did not include mandatory reporting on transfers to recycling and energy recovery until the 1998 reporting year.

As explained in **Chapter 2**, this chapter analyzes data for industries and chemicals that must be reported in both the United States and Canada (the matched data set). Comparable Mexican data are not available for the 2002 reporting year and before. Also, transfers of metals, except those to recycling, are included in one category in order to make the TRI and NPRI data comparable. TRI classifies transfers of metals in only two ways—transfers to recycling or transfers to disposal—because metals are not destroyed by treatment or burned in energy recovery.

8.2 2002 Off-site Transfers Within Country and Cross-Border

Chemicals can be transferred off-site to another facility for recycling, further management (energy recovery or treatment), or disposal.

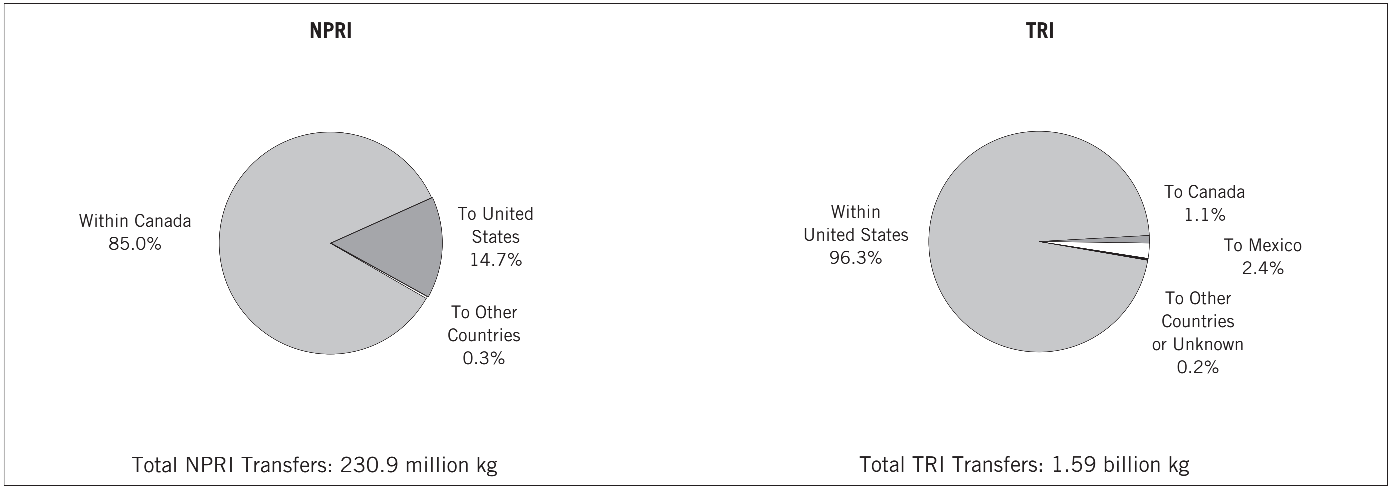
- In North America, transfers to other facilities and sites (not including transfers to sewage) totaled 1.82 billion kg, with transfers from TRI facilities accounting for 87 percent and NPRI facilities accounting for 13 percent.
- NPRI facilities transferred off-site 230.9 million kg of matched chemicals in 2002, with 77 percent transferred to recycling.
- NPRI facilities sent 34.0 million kg of matched chemicals to US locations in 2002. This represented 15 percent of all such transfers reported by Canadian facilities. More than 83 percent of the transfers sent to the United States were transferred for recycling.
- TRI facilities transferred off-site 1.59 billion kg of matched chemicals in 2002, with 56 percent transferred to recycling and 22 percent transferred to energy recovery.
- TRI facilities sent 16.7 million kg of matched chemicals to Canadian locations. This represented 1 percent of all such transfers reported by US facilities. Over 59 percent of transfers to Canada were for recycling and 20 percent were for energy recovery.
- TRI facilities sent 38.3 million kg to Mexican locations, almost all of it for recycling to sites in Monterrey, Nuevo León. This represented 2 percent of off-site transfers reported by US facilities in 2002. TRI facilities transferred more than twice the amount of chemicals to Mexico as to NPRI facilities.

Table 8–1. Off-site Transfers Within Country and Cross-Borders, 2002

	Type of Transfer						
	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Disposal/ Energy Recovery/ Treatment (kg)	Total Transfers (kg)
From Canadian NPRI Facilities	**161,696,034**	**15,460,881**	**8,310,365**	**15,143,184**	**4,026,907**	**26,273,011**	**230,910,382**
Within Canada	135,180,402	13,106,504	5,248,616	14,065,014	2,987,451	25,779,702	196,367,689
To United States	25,942,664	2,354,377	3,061,749	1,078,170	1,039,456	493,235	33,969,651
To Mexico	0	0	0	0	0	0	0
To Other Countries	572,968	0	0	0	0	73	573,041
From US TRI Facilities	**761,107,935**	**127,159,237**	**349,563,874**	**112,594,621**	**20,689,550**	**217,661,910**	**1,588,777,128**
Within United States	710,646,946	126,482,629	346,261,245	110,209,699	20,568,758	216,389,713	1,530,558,990
To Canada	9,310,599	587,342	3,287,162	2,383,743	97,325	1,056,966	16,723,137
To Mexico	38,063,149	45,020	0	0	0	207,503	38,315,672
To Other Countries or Unknown	3,087,242	44,245	15,467	1,179	23,467	7,728	3,179,329
From Mexican Facilities	Data not available.						

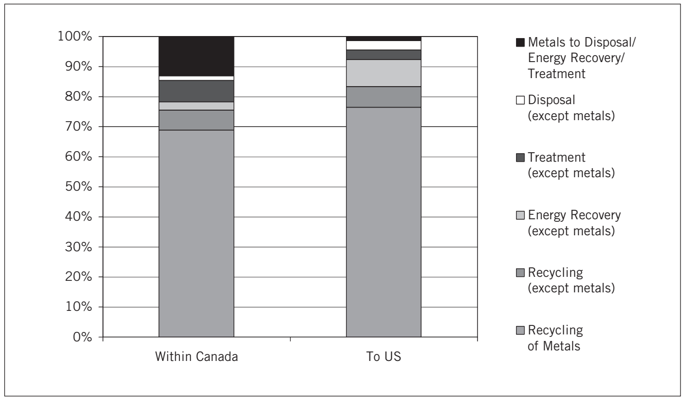
Note: Does not include transfers to sewage. Data on Mexico transfers to US or Canada not available for 2002.

Figure 8–1. Percentage of Transfers Sent to Sites Within and Outside Country, NPRI and TRI, 2002



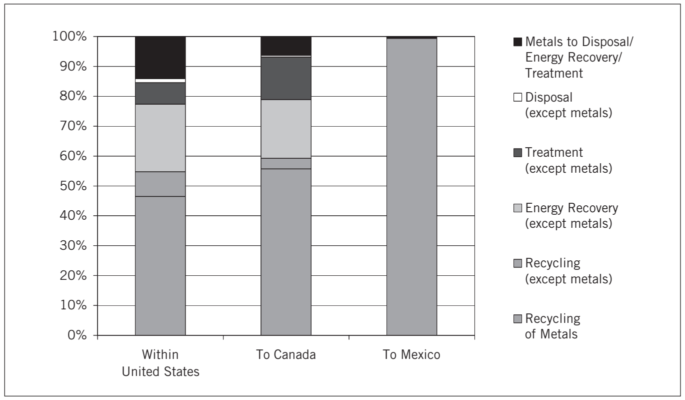
Note: Does not include transfers to sewage.

Figure 8–2. Transfers from NPRI Facilities to Sites within Canada and to the US, by Type of Transfer, 2002



Note: Does not include transfers to sewage.

Figure 8–3. Transfers from TRI Facilities to Sites within the US and to Canada and Mexico, by Type of Transfer, 2002



Note: Does not include transfers to sewage.

- Mexico has not begun to collect mandatory data on transfers so it is not known how much was transferred to the United States or Canada from Mexico in 2002.

8.2.1 Where Off-site Transfers were Sent, 2002

Sites receiving transfers are concentrated injust a few states and provinces.

- More than 50 percent of transfers sent from NPRI facilities went to sites in Ontario. Another 15 percent went to sites in Quebec, and 15 percent went to sites in the United States.
- Almost all of the metals sent for disposal were sent within Canada, with 40 percent going to Ontario, 19 percent to Quebec, and just 2 percent to US sites. In addition, 52 percent of all transfers sent for recycling from Canadian facilities went to Ontario sites, with 16 percent going to US sites.
- The largest amount of transfers from Canada to the United States went to the state of Pennsylvania—11.0 million kg, representing 32 percent of all transfers from Canadian facilities to US sites, almost all of it as transfers to recycling. Three Ontario facilities (Dofasco Inc. in Hamilton, Gerdau AmeriSteel in Whitby and Ivaco Rolling Mills in L'Orignal) sent 7.6 million kg of mainly zinc and its compounds for recycling to Horsehead Resource Development in Palmerton. Another 24 percent went to the state of Michigan—8.1 million kg, almost all of it also as transfers to recycling. One facility, Waltec Forgings in Wallaceburg, Ontario, sent more than 3.0 million kg of copper and zinc for recycling to the Mueller Brass Co. in Port Huron, Michigan.

Table 8–2. NPRI Off-site Transfers within Canada and from Canada to Sites in Other Countries, 2002

	Type of Transfer							
Receiving Province/ State	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Disposal/ Energy Recovery/ Treatment (kg)	Total Transfers (kg)	% of Total
Within Canada	**135,180,402**	**13,106,504**	**5,248,616**	**14,065,014**	**2,987,451**	**25,779,702**	**196,367,689**	**85.0**
Alberta	1,696,701	2,158,752	933,828	480,087	707,067	2,648,854	8,625,289	3.7
British Columbia	24,080,157	16,324	68,793	37,075	175,987	2,141,132	26,519,469	11.5
Manitoba	728,047	71,218	12,090	201,428	6,077	1,347,936	2,366,796	1.0
New Brunswick	3,227,062	15,022	0	297,484	17,811	515,132	4,072,510	1.8
Newfoundland and Labrador	0	0	0	0	0	43,675	43,675	0.02
Nova Scotia	105,048	2,221	11	14,459	32,040	108,791	262,569	0.1
Ontario	82,590,490	8,716,132	3,964,035	8,779,356	1,486,928	10,611,517	116,148,458	50.3
Prince Edward Island	10,514	0	0	0	0	35,094	45,608	0.02
Quebec	22,390,248	2,119,765	269,859	4,235,813	522,916	4,968,971	34,507,572	14.9
Saskatchewan	352,135	7,070	0	19,312	38,625	3,358,601	3,775,743	1.6
To United States	**25,942,664**	**2,354,377**	**3,061,749**	**1,078,170**	**1,039,456**	**493,235**	**33,969,651**	**14.7**
Alabama	1,000	0	0	0	0	0	1,000	0.0004
Arkansas	0	0	0	0	0	609	609	0.0003
California	179,482	1,402	0	467	0	0	181,351	0.1
Connecticut	4,218	0	0	0	0	0	4,218	0.002
Georgia	14,452	0	0	0	0	0	14,452	0.006
Idaho	5,495	0	0	0	0	0	5,495	0.002
Illinois	119,326	992,930	0	32,891	0	0	1,145,147	0.5
Indiana	268,087	0	216,831	35,138	0	567	520,623	0.2
Kansas	0	0	723,208	3,080	0	1,382	727,670	0.3
Louisiana	163,987	473,026	0	95	0	0	637,108	0.3
Maryland	352	7,928	0	0	0	0	8,280	0.004
Michigan	7,249,787	728,167	53,188	28,271	290	52,954	8,112,657	3.5
Missouri	789,700	0	483,770	0	0	0	1,273,470	0.6
Nebraska	234,260	0	0	0	0	0	234,260	0.1
Nevada	500	0	0	0	0	0	500	0.0002
New Jersey	967,024	54,328	0	0	0	0	1,021,352	0.4
New York	2,022,880	0	0	0	6,910	90,559	2,120,349	0.9
North Carolina	32,540	2,965	0	0	0	0	35,505	0.02
Ohio	2,438,139	0	1,068,189	939,003	1,031,880	324,660	5,801,870	2.5
Oregon	0	0	0	0	0	3	3	0.000001
Pennsylvania	11,003,674	2,509	9,284	22,960	376	10	11,038,813	4.8
Rhode Island	6,889	0	0	0	0	0	6,889	0.003
South Carolina	0	8,500	485,333	0	0	0	493,833	0.2
Texas	426,652	21,282	0	0	0	0	447,934	0.2
Utah	0	0	0	0	0	407	407	0.0002
Washington	14,219	0	21,946	16,265	0	22,085	74,515	0.03
West Virginia	0	61,340	0	0	0	0	61,340	0.03
To Other Countries	**572,968**	**0**	**0**	**0**	**0**	**73**	**573,041**	**0.3**
Total	**161,696,034**	**15,460,881**	**8,310,365**	**15,143,184**	**4,026,907**	**26,273,011**	**230,910,382**	**100.0**

Table 8–3. TRI Off-site Transfers within the US and from the US to Sites in Other Countries, 2002

	Type of Transfer							
Receiving Country	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Disposal/ Energy Recovery/ Treatment (kg)	Total Transfers (kg)	% of Total
To Canada	**9,310,599**	**587,342**	**3,287,162**	**2,383,743**	**97,325**	**1,056,966**	**16,723,137**	**1.1**
Alberta	2,176,249	0	0	0	0	28	2,176,277	0.1
British Columbia	87,436	0	907	2,736	0	20	91,098	0.006
New Brunswick	26,740	0	0	0	0	0	26,740	0.002
Ontario	3,788,102	97,278	3,254,986	2,264,388	92,685	568,703	10,066,142	0.6
Quebec	3,196,164	490,064	31,268	116,620	4,640	488,216	4,326,972	0.3
Saskatchewan	35,908	0	0	0	0	0	35,908	0.002
Within United States	**710,646,946**	**126,482,629**	**346,261,245**	**110,209,699**	**20,568,758**	**216,389,713**	**1,530,558,990**	**96.3**
Alabama	16,038,261	1,815,147	5,549,366	1,165,628	1,606,310	2,716,425	28,891,137	1.8
Alaska	2,013,779	5	13,547	34,008	3	315	2,061,656	0.1
Arizona	8,407,594	521,147	266,372	267,766	68,797	274,014	9,805,690	0.6
Arkansas	6,707,034	709,501	20,027,410	3,406,010	262,111	740,497	31,852,563	2.0
California	27,938,508	7,412,530	3,216,643	963,692	870,530	2,170,231	42,572,134	2.7
Colorado	1,067,020	3,697,179	4,067,877	1,044,187	77,150	402,880	10,356,292	0.7
Connecticut	10,531,731	207,128	583,415	272,807	103,759	227,492	11,926,330	0.8
Delaware	23,394	859,506	17,976	583,553	3,633	16,124	1,504,187	0.1
Florida	4,941,828	164,769	160,840	161,161	306,143	564,254	6,298,995	0.4
Georgia	8,675,276	779,225	1,832,307	711,073	131,083	858,582	12,987,547	0.8
Guam	6,838	0	0	0	0	0	6,838	0.0004
Hawaii	0	2,399	2	0	714	20,789	23,904	0.002
Idaho	1,649,911	4,580	11,787	2,125	24,236	12,927,137	14,619,777	0.9
Illinois	87,449,554	2,453,430	4,199,636	4,049,643	1,388,299	16,824,809	116,365,372	7.3
Indiana	92,700,250	12,660,327	56,122,711	5,407,515	557,901	29,138,162	196,586,866	12.4
Iowa	9,237,316	40,399	25,079	2,771	282,139	662,787	10,250,491	0.6
Kansas	1,581,556	169,767	13,811,056	470,665	70,225	872,057	16,975,326	1.1
Kentucky	3,585,952	1,842,544	2,240,997	2,136,465	254,696	1,798,734	11,859,388	0.7
Louisiana	3,539,327	3,873,211	5,856,409	11,962,657	792,860	1,977,732	28,002,197	1.8
Maine	294,456	2,403	4,888	11,800	10,546	415,169	739,263	0.05
Maryland	3,613,312	222,074	2,590,315	4,993,857	88,964	850,979	12,359,501	0.8
Massachusetts	5,860,363	426,719	964,347	498,629	95,220	679,521	8,524,799	0.5
Michigan	34,267,702	10,460,243	19,774,459	6,848,486	1,734,432	31,000,487	104,085,809	6.6
Minnesota	7,349,849	22,926	293,670	4,965,931	15,322	582,329	13,230,027	0.8
Mississippi	6,652,442	55,948	5,680,799	83,316	63,513	263,696	12,799,715	0.8
Missouri	52,108,231	618,158	38,853,857	1,225,250	130,154	2,786,778	95,722,429	6.0
Montana	375,608	18,771	0	0	122	55,642	450,144	0.03
Nebraska	3,017,061	32,300	64,728	687,550	397,512	477,199	4,676,350	0.3
Nevada	255,218	1,068,626	35,505	47,449	73,807	1,045,498	2,526,102	0.2
New Hampshire	707,065	0	0	0	9,526	174,457	891,048	0.1
New Jersey	14,164,911	8,437,879	8,230,621	6,278,253	199,001	939,108	38,249,774	2.4
New Mexico	5,369	96,414	8,326	724	1,414	552,953	665,200	0.04
New York	16,253,369	355,831	5,525,414	1,533,209	383,127	3,465,440	27,516,391	1.7
North Carolina	13,131,053	4,580,419	2,200,190	756,504	1,128,366	1,069,776	22,866,308	1.4
North Dakota	657,555	1,219	0	3,193	2,187	860,518	1,524,673	0.1
Ohio	53,981,382	16,098,195	40,672,091	14,826,728	2,678,811	43,884,598	172,141,805	10.8
Oklahoma	2,748,593	136,376	442,604	146,569	455,478	3,887,266	7,816,885	0.5
Oregon	3,278,288	296,682	46,650	28,836	234,637	904,718	4,789,811	0.3
Pennsylvania	113,432,554	317,268	11,890,435	2,075,164	651,926	27,069,425	155,436,772	9.8
Puerto Rico	606,195	1,621,569	3,304,465	1,362,625	34,597	180,231	7,109,682	0.4
Rhode Island	1,893,017	333,207	2,644	62,205	6,200	53,853	2,351,126	0.1
South Carolina	9,993,406	5,486,082	30,126,572	1,883,882	243,303	2,698,591	50,431,837	3.2
South Dakota	74,032	3,766	0	340	172	13,824	92,134	0.006
Tennessee	29,272,881	1,044,272	2,190,154	546,935	444,222	2,070,015	35,568,478	2.2
Texas	33,265,628	28,142,137	46,535,924	23,113,124	3,277,223	3,668,623	138,002,658	8.7
Utah	948,521	9,994	34,837	1,058,977	173,903	3,487,159	5,713,391	0.4
Vermont	8,580	0	20,118	13,964	1,014	3,954	47,630	0.003
Virginia	714,120	1,796,091	6,194,672	506,669	206,476	3,133,344	12,551,371	0.8
Washington	841,724	298,575	571,326	426,770	12,247	444,494	2,595,136	0.2
West Virginia	1,252,589	2,079,093	114,551	39,933	27,817	1,401,248	4,915,232	0.3
Wisconsin	13,526,743	5,132,781	1,883,653	3,541,097	986,878	5,988,568	31,059,721	2.0
Wyoming	0	73,816	0	3	52	87,231	161,102	0.01
To Mexico	**38,063,149**	**45,020**	**0**	**0**	**0**	**207,503**	**38,315,672**	**2.4**
Monterrey, Nuevo León	37,809,528	1,020	0	0	0	207,503	38,018,051	2.4
Other Cities	253,620	44,000	0	0	0	0	297,621	0.02
To Other Countries or Unknown	**3,087,242**	**44,245**	**15,467**	**1,179**	**23,467**	**7,728**	**3,179,329**	**0.2**
Total	**761,107,935**	**127,159,237**	**349,563,874**	**112,594,621**	**20,689,550**	**217,661,910**	**1,588,777,128**	**100.0**

- More than 12 percent of transfers sent from TRI facilities went to sites in Indiana. Another 11 percent went to sites in Ohio, and 1 percent went to sites in Canada.
- Indiana received 16 percent of all transfers from TRI facilities to energy recovery. Ohio received 20 percent of all metals sent for disposal from US facilities.
- The largest amount of transfers from the United States to Canada was sent to Ontario—10.1 million kg, representing 60 percent of all US transfers to Canada—primarily as transfers to recycling or energy recovery. The Petro-Chem Processing Group facility in Detroit, Michigan, sent 3.2 million kg for energy recovery to Philip Services Inc. in Hamilton, Ontario. Another 26 percent of the transfers from the United States to Canada went to the province of Quebec (4.3 million kg), primarily as transfers to recycling. Four facilities owned by the Exide Corp. sent lead and antimony and their compounds for recycling to Nova Pb in Ste. Catherine, Quebec.
- Even though most of transfers from the United States to Canada were to recycling and energy recovery, these amounts were still very small (about 1%) compared to the total amounts transfers to recycling and energy recovery within the United States.

8.2.2 Facilities Sending and Receiving Cross-Border Transfers, 2002

A relatively small number of facilities transfer listed substances in the matched data set across the Canada-US border.

- For 2002, 285 TRI facilities and 163 NPRI facilities reported transfers across the Canada-US border.
- Two TRI facilities and eight NPRI facilities reported one million kg or more of cross-border transfers in 2002.
- The 10 facilities in each country with the largest cross-border transfers accounted for over half of all transfers and over 45 percent of such transfers of metals and their compounds destined for recycling.

Table 8–4. NPRI Facilities with Largest Transfers to the US from Canada, 2002

Rank	Facility	City, Province	SIC Code Canada	SIC Code US	Number of Facilities Reporting Transfers to the US
1	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33	1
2	Waltec Forgings Inc., Wallaceburg Forge Plant	Wallaceburg, ON	30	34	1
3	Gerdau AmeriSteel, Whitby	Whitby, ON	29	33	1
4	Brass Craft Canada Ltd.	St. Thomas, ON	30	34	1
5	Ivaco Rolling Mills Limited Partnership	L'Orignal, ON	29	33	1
6	Philip Enterprises Inc., Fort Erie Facility	Fort Erie, ON	77	495/738	1
7	L&M Precision Products Inc.	Toronto, ON	30	34	1
8	DNN Galvanizing	Windsor, ON	29	33	1
9	Quebecor World inc., Quebecor World Islington	Etobicoke, ON	28	27	1
10	Safety-Kleen Canada Inc., Centre de Recyclage de St-Constant	St-Constant, QC	99	495/738	1
	Subtotal				**10**
	% of Total				**6**
	Total				**163**

Table 8–5. TRI Facilities with Largest Transfers to Canada from the US, 2002

Rank	Facility	City, State	US SIC Code	Number of Facilities Reporting Transfers to Canada
1	Petro-Chem Processing Group/Solvent Distillers Group, Philip Services Corp.	Detroit, MI	495/738	1
2	Dow Corning Corp.	Midland, MI	Mult.	1
3	Wheatland Tube Co. Wheatland Plant, John Maneely Co.	Wheatland, PA	Mult.	1
4	Exide Corp.	Fort Smith, AR	36	1
5	GE Co. Silicone Prods.	Waterford, NY	28	1
6	Exide Techs. Dba GNB Indl. Power	Kankakee, IL	36	1
7	Wheatland Tube Co. Sharon Plant, John Maneely Co.	Sharon, PA	33	1
8	Dow Corning Corp.	Carrollton, KY	28	1
9	World Resources Co.	Tolleson, AZ	33	1
10	Traer Mfg. Inc.	Traer, IA	34	1
	Subtotal			**10**
	% of Total			**4**
	Total			**285**

Table 8–4. (*continued*)

Rank	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Disposal/ Energy Recovery/ Treatment (kg)	Total Transfers (kg)	Chemicals Transferred in Largest Amounts
1	3,679,006	0	0	0	0	0	3,679,006	Zinc and compounds (transfers to recycling)
2	3,004,987	0	0	0	0	0	3,004,987	Copper/Zinc and compounds (transfers to recycling)
3	2,344,739	0	0	0	0	0	2,344,739	Zinc and compounds (transfers to recycling)
4	2,190,700	0	0	0	0	0	2,190,700	Copper and compounds (transfers to recycling)
5	1,576,672	0	0	0	0	0	1,576,672	Zinc and compounds (transfers to recycling)
6	29,930	0	0	0	855,790	397,252	1,282,972	Nitric acid and nitrate compounds (transfers to disposal), Chromium and compounds (transfers to recycling)
7	1,093,096	0	0	0	0	0	1,093,096	Copper/Zinc and compounds (transfers to recycling)
8	1,002,000	0	0	0	0	0	1,002,000	Zinc and compounds (transfers to recycling)
9	0	975,020	0	0	0	0	975,020	Toluene (transfers to recycling)
10	0	0	969,103	0	0	0	969,103	Toluene, Xylenes (transfers to energy recovery)
	14,921,130	**975,020**	**969,103**	**0**	**855,790**	**397,252**	**18,118,295**	
	58	**41**	**32**	**0**	**82**	**81**	**53**	
	25,942,664	**2,354,377**	**3,061,749**	**1,078,170**	**1,039,456**	**493,235**	**33,969,651**	

Table 8–5. (*continued*)

Rank	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Disposal/ Energy Recovery/ Treatment (kg)	Total Transfers (kg)	Chemicals Transferred in Largest Amounts
1	0	0	3,241,809	459,216	0	0	3,701,024	Methanol, Toluene, Xylenes (transfers to energy recovery)
2	0	0	0	1,325,222	0	0	1,325,222	Xylenes, Methanol, Toluene (transfers to treatment)
3	907,676	0	0	0	0	0	907,676	Zinc and compounds (transfers to recycling)
4	679,943	0	0	0	0	0	679,943	Lead and compounds (transfers to recycling)
5	582,671	0	0	365	0	16,553	599,589	Copper and compounds (transfers to recycling)
6	478,766	0	0	0	0	0	478,766	Lead and compounds (transfers to recycling)
7	444,308	0	0	0	0	0	444,308	Zinc and compounds (transfers to recycling)
8	429,907	0	0	0	0	0	429,907	Copper and compounds (transfers to recycling)
9	400,242	0	0	0	0	0	400,242	Copper and compounds (transfers to recycling)
10	396,236	0	0	0	0	0	396,236	Zinc/Manganese and compounds (transfers to recycling)
	4,319,749	**0**	**3,241,809**	**1,784,803**	**0**	**16,553**	**9,362,914**	
	46	**0**	**99**	**75**	**0**	**2**	**56**	
	9,310,599	**587,342**	**3,287,162**	**2,383,743**	**97,325**	**1,056,966**	**16,723,137**	

The US states of Pennsylvania and Michigan received the largest amounts of transfers from NPRI facilities.

- By far, the site in Pennsylvania with the largest transfers from Canadian facilities was Horsehead Resource Development in Palmerton. It received 7.6 million kg from Canadian facilities (representing 21 percent of all transfers to this site in 2002) and 28.3 million kg from US facilities. All of the transfers from Canada to this site were of metals and their compounds for recycling.
- One site in Michigan (Mueller Brass Co. in Port Huron) received 3.8 million kg from Canadian facilities, which represented 37 percent of the 10.4 million kg reported transferred to this site from both Canada and the United States in 2002. All of the transfers to this site were metals and their compounds for recycling.
- A second site in Michigan (Arco Alloys Corp. in Detroit) received 1.0 million kg from Canadian facilities, which represented 94 percent of all transfers to this site in 2002. All of the transfers to this site were metals and their compounds for recycling.

Table 8–6. Sites in Pennsylvania that Received the Largest Transfers from Canada, 2002

Rank for Transfers from Canada	Receiving Site	Location	City, State	Number of Facilities	Number of Forms
1	Horsehead Resource Development	Delaware Avenue	Palmerton, PA	3	22
2	Metal Chem	Washington Rd.	Pittsburgh, PA	3	3
3	Thalheimer	Whitaker avenue	Philadelphia, PA	1	5
4	Horsehead Corp. - Monaca Smelter	Frankfort Road	Monaca, PA	2	3
5	Cerro Metal Products	Route 144 South	Bellefonte, PA	1	6
1	Horsehead Resource Development	Delaware Avenue	Palmerton, PA	24	149
2	Metal Chem	Washington Rd.	Pittsburgh, PA	20	34
3	Thalheimer	Whitaker avenue	Philadelphia, PA	53	106
4	Horsehead Corp. - Monaca Smelter	Frankfort Road	Monaca, PA	53	96
5	Cerro Metal Products	Route 144 South	Bellefonte, PA	14	24

Table 8–7. Sites in Michigan that Received the Largest Transfers from Canada, 2002

Rank for Transfers from Canada	Receiving Site	Location	City, State	Number of Facilities	Number of Forms
1	Mueller Brass Co.	Lapeer Avenue	Port Huron, MI	4	13
2	Arco Alloys Corp.	Trombly Street	Detroit, MI	1	1
3	Extruded Metals Inc.	Ashfield Street	Belding, MI	1	6
4	Gage Products	Wanda Avenue	Ferndale, MI	3	20
5	Imco Recycling of Michigan L.L.C.	North Fillmore Road	Coldwater, MI	1	1
1	Mueller Brass Co.	Lapeer Avenue	Port Huron, MI	26	58
2	Arco Alloys Corp.	Trombly Street	Detroit, MI	3	4
3	Extruded Metals Inc.	Ashfield Street	Belding, MI	16	36
4	Gage Products	Wanda Avenue	Ferndale, MI	34	262
5	Imco Recycling of Michigan L.L.C.	North Fillmore Road	Coldwater, MI	4	6

Table 8–6. (*continued*)

Rank for Transfers from Canada	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Disposal/ Energy Recovery/ Treatment (kg)	Total Transfers (kg)	Total North American Transfers (kg)	From Canada (%)
From Canadian NPRI Facilities									
1	7,600,417	0	0	0	0	0	7,600,417	35,937,765	21
2	1,018,861	0	0	0	0	0	1,018,861	4,829,690	21
3	723,330	0	0	0	0	0	723,330	4,549,924	16
4	423,164	0	0	0	0	0	423,164	6,069,052	7
5	333,200	0	0	0	0	0	333,200	5,527,175	6
From US TRI Facilities									
1	28,334,474	2,857	0	0	0	17	28,337,348		
2	3,810,730	0	0	0	0	100	3,810,829		
3	3,826,511	83	0	0	0	0	3,826,594		
4	5,645,688	0	0	0	0	200	5,645,888		
5	5,193,975	0	0	0	0	0	5,193,975		

Table 8–7. (*continued*)

Rank for Transfers from Canada	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Disposal/ Energy Recovery/ Treatment (kg)	Total Transfers (kg)	Total North American Transfers (kg)	From Canada (%)
From Canadian NPRI Facilities									
1	3,840,268	0	0	0	0	0	3,840,268	10,447,951	37
2	1,002,000	0	0	0	0	0	1,002,000	1,066,433	94
3	922,200	0	0	0	0	0	922,200	9,791,864	9
4	61	711,059	0	0	0	0	711,120	6,436,606	11
5	639,700	0	0	0	0	0	639,700	646,938	99
From US TRI Facilities									
1	6,607,683	0	0	0	0	0	6,607,683		
2	64,433	0	0	0	0	0	64,433		
3	8,869,664	0	0	0	0	0	8,869,664		
4	2	5,715,953	1,891	2,204	0	5,435	5,725,486		
5	7,238	0	0	0	0	0	7,238		

The Canadian provinces of Ontario and Quebec received the largest amounts of transfers from TRI facilities.

- One site in Hamilton, Ontario, owned by Philip Services Inc. received a total of 3.2 million kg for energy recovery from the United States (98 percent of all transfers received at this site) and almost 62,000 kg from sites within Canada.
- Another Ontario site (Clean Harbors Canada in Corunna) received 2.6 million kg from TRI facilities, which represented 20 percent of the total transfers it received in 2002 (this site also received 10.9 million kg from NPRI facilities). Most of the transfers from both TRI and NPRI facilities were of chemicals other than metals sent for treatment or of metals sent for disposal.
- One site in Quebec (Nova Pb in Ste. Catherine) received 1.7 million kg from US facilities (67 percent of the total transfers received at this site) and over 806,000 kg from Canadian facilities. Most of these transfers were sent for recycling.
- A second Quebec site (Noranda Horne Smelter in Rouyn-Noranda) received 1.4 million kg from US facilities and 2.4 million kg from Canadian facilities. Most of these transfers were of metals and their compounds for recycling.

Table 8–8. Sites in Ontario that Received the Largest Transfers from the US, 2002

Rank for Transfers from US	Receiving Site	Location	City, Province	Number of Facilities	Number of Forms
1	Philip Services Inc.	Parkdale Avenue #519	Hamilton, ON	1	7
2	Clean Harbors Canada Inc., Lambton Facility	Telfer Road	Corunna, ON	50	306
3	Falconbridge Ltd-Kidd Metallurgical Div., Kidd Metallurgical Site	Hwy 101 East	Timmins/District of Cochrane, ON	9	28
4	Sam Adelstein & Co. Limited	Welland Avenue	St. Catharines, ON	5	18
5	Triple M Metal	Intermodal Drive	Brampton, ON	4	11
1	Philip Services Inc.	Parkdale Avenue #519	Hamilton, ON	15	22
2	Clean Harbors Canada Inc., Lambton Facility	Telfer Road	Corunna, ON	92	396
3	Falconbridge Ltd-Kidd Metallurgical Div., Kidd Metallurgical Site	Hwy 101 East	Timmins/District of Cochrane, ON	6	16
4	Sam Adelstein & Co. Limited	Welland Avenue	St. Catharines, ON	3	11
5	Triple M Metal	Intermodal Drive	Brampton, ON	60	167

Table 8–9. Sites in Quebec that Received the Largest Transfers from the US, 2002

Rank for Transfers from US	Receiving Site	Location	City, Province	Number of Facilities	Number of Forms
1	Nova Pb Incorporated	Garnier Street	Ste. Catherine, QC	11	17
2	Noranda Inc., Fonderie Horne	Rue Portelance	Rouyn-Noranda, QC	13	34
3	Stablex Canada, Inc.	Boulevard Industriel	Blainville, QC	56	196
4	Chemrec Inc.	Rue Brosseau	Cowansville, QC	9	20
5	Noranda General Smelting Co of Canada	Norman Street	Lachine, QC	1	1
1	Nova Pb Incorporated	Garnier Street	Ste. Catherine, QC	5	5
2	Noranda Inc., Fonderie Horne	Rue Portelance	Rouyn-Noranda, QC	9	23
3	Stablex Canada, Inc.	Boulevard Industriel	Blainville, QC	82	213
4	Chemrec Inc.	Rue Brosseau	Cowansville, QC	17	42
5	Noranda General Smelting Co of Canada	Norman Street	Lachine, QC	11	13

Table 8–8. (*continued*)

Rank for Transfers from US	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Disposal/ Energy Recovery/ Treatment (kg)	Total Transfers (kg)	Total North American Transfers (kg)	From US (%)
				From US TRI Facilities					
1	0	0	3,218,932	0	0	0	3,218,932	3,280,819	98
2	0	0	2	2,248,093	72,917	323,419	2,644,431	13,497,370	20
3	569,113	0	0	29	0	2	569,145	4,145,423	14
4	559,154	0	0	0	0	0	559,154	1,660,616	34
5	523,844	0	0	0	0	0	523,844	23,954,968	2
				From Canadian NPRI Facilities					
1	5,926	16,415	0	19,530	7,270	12,746	61,887		
2	4,313	56,531	563,617	5,255,425	488,830	4,484,222	10,852,938		
3	3,549,965	0	0	26,313	0	0	3,576,278		
4	1,056,762	36,800	0	1,050	0	6,850	1,101,462		
5	23,431,125	0	0	0	0	0	23,431,125		

Table 8–9. (*continued*)

Rank for Transfers from US	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Disposal/ Energy Recovery/ Treatment (kg)	Total Transfers (kg)	Total North American Transfers (kg)	From US (%)
				From US TRI Facilities					
1	1,652,082	0	0	0	0	4,736	1,656,817	2,463,292	67
2	1,342,342	0	0	0	0	16,553	1,358,895	3,801,274	36
3	82	0	0	85,251	2,524	459,145	547,001	3,616,988	15
4	0	490,062	0	0	0	0	490,062	1,571,130	31
5	94,331	0	0	0	0	0	94,331	1,601,882	6
				From Canadian NPRI Facilities					
1	561,765	232,780	0	11,930	0	0	806,475		
2	2,421,302	7,277	0	0	0	0	2,442,379		
3	75	18,900	0	251,091	208,781	2,591,139	3,069,986		
4	0	1,066,014	7,315	7,739	0	0	1,081,068		
5	1,507,551	0	0	0	0	0	1,507,551		

8.2.3 Total Transfers Received within a State or Province, 2002

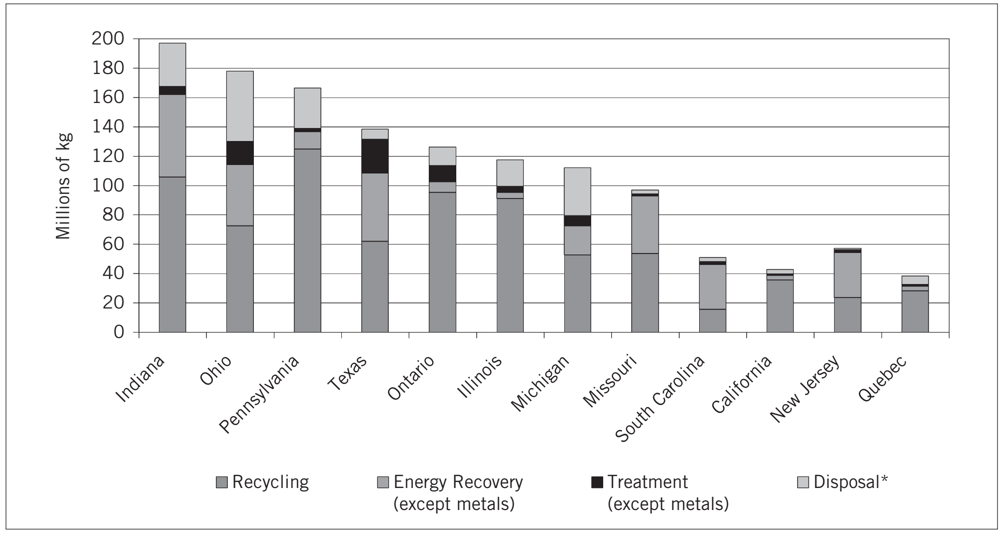
Sites within a state or province receive transfers for recycling, energy recovery, treatment or disposal. Within each state or province, transfer sites handle wastes by one or more of these methods.

- For transfer sites in Indiana (the jurisdiction receiving the most transfers in 2002), 54 percent of total transfers received were for recycling and 29 percent were for energy recovery.
- For transfer sites in Ohio, 41 percent of total transfers received were for recycling, 27 percent were to disposal (including metals sent for disposal, energy recovery and treatment) and 23 percent were for energy recovery.
- For both Pennsylvania and Ontario, transfers received for recycling were 75 percent of all transfers received while, for Texas, 45 percent were for recycling and 34 percent were for energy recovery.

"Loadings"—Total Releases within a State or Province

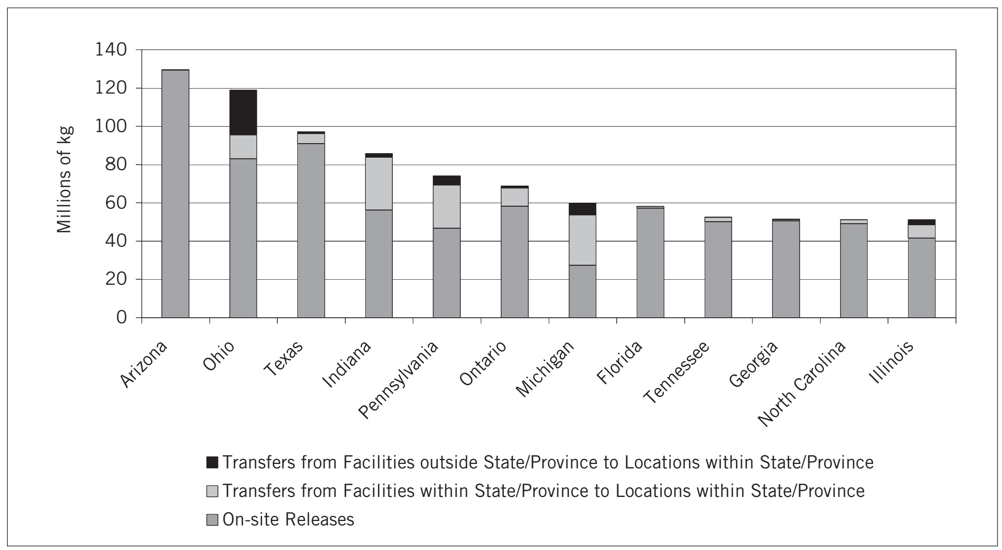
Transfers to disposal are, primarily, transfers destined for landfills at the transfer site similar to on-site land releases that are, primarily, into landfills at the reporting facility location. This analysis takes into account the transfers to disposal as well as all releases at the facility location to give an estimate of the total "loading" of releases within the borders of each state/province. Total releases within a state or province, therefore, include: (1) off-site transfers to disposal (off-site releases) transferred within the state or province, (2) off-site transfers to disposal (off-site releases) transferred by facilities located outside the jurisdiction to sites within the state or province, and (3) on-site releases at facilities located within the jurisdiction. Not included in this total are transfers from facilities in the jurisdiction sent off-site to disposal (off-site releases) to locations outside the state or province.

Figure 8–4. States and Provinces with Largest Total Transfers Received Within the State/Province, 2002



Note: Does not include transfers to sewage. Data on Mexico transfers to US or Canada not available for 2002.
* Disposal includes transfers to disposal of substances that are not metals and metals transferred to disposal, energy recovery and treatment.

Figure 8–5. States and Provinces with Largest Total Releases (adjusted) Within the State/Province, 2002



Note: Off-site releases (transfers to disposal or transfers of metals except to recycling) are omitted (adjusted) if the amount of off-site release is also reported as an on-site release by another facility within the state/province.

Table 8–10. Total Releases (adjusted) within State/Province, 2002

State/Province	Transfers to Disposal (Off-site Releases Adjusted)*: Transfers from Facilities within State/Province to Locations within State/Province: Transfers Off-site to Disposal (except metals) (kg)	Transfers of Metals (kg)	Transfers from Facilities outside State/Province to Locations within State/Province: Transfers Off-site to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total On-site Releases kg	Rank	Total Releases (adjusted) within State/Province* kg	Rank
Alabama	1,473,894	1,685,313	110,028	479,536	44,720,055	11	48,468,826	13
Alaska	0	0	3	237	117,786	61	118,026	61
Alberta	683,361	1,786,273	8,154	176,133	11,980,065	28	14,633,986	28
Arizona	21,353	80,171	47,364	64,663	129,355,899	1	129,569,450	1
Arkansas	17,337	296,888	244,064	408,787	11,117,235	30	12,084,312	30
British Columbia	175,987	2,096,228	0	20	12,122,771	27	14,395,006	29
California	818,320	940,056	1,573	32,705	14,534,047	26	16,326,701	27
Colorado	9,090	371,663	68,059	1,572	4,023,221	43	4,473,606	45
Connecticut	72,417	156,568	31,341	80,142	1,900,711	52	2,241,179	52
Delaware	75	19,017	3,558	1,418	3,246,666	46	3,270,734	49
District of Columbia	0	0	0	313	27,301	64	27,614	64
Florida	302,751	516,589	3,392	77,215	55,404,908	6	56,304,856	8
Georgia	66,379	633,180	64,705	260,637	50,492,616	7	51,517,516	10
Guam	0	0	0	0	70,593	63	70,593	63
Hawaii	714	20,789	0	0	1,055,131	56	1,076,634	56
Idaho	20,284	8,733	205	1,440,434	17,667,098	23	19,136,754	24
Illinois	1,259,362	5,729,917	128,657	2,468,067	41,594,436	13	51,180,439	12
Indiana	395,929	27,244,548	161,611	1,892,138	56,135,698	5	85,829,925	4
Iowa	281,618	651,158	521	24,395	10,307,449	31	11,265,141	31
Kansas	41,894	691,055	28,275	181,959	6,559,396	37	7,502,579	36
Kentucky	203,160	1,406,460	50,356	395,783	34,492,796	15	36,548,555	16
Louisiana	299,081	1,196,479	297,982	329,368	43,179,127	12	45,302,036	14
Maine	10,546	314,270	0	79,261	3,477,130	44	3,881,207	48
Manitoba	5,976	1,286,265	101	4,208	3,450,892	45	4,747,442	42
Maryland	7,301	675,098	81,663	177,240	18,032,827	22	18,974,128	25
Massachusetts	27,097	457,663	68,008	234,509	2,414,904	50	3,202,181	50
Michigan	1,176,007	25,248,046	550,524	5,684,998	27,275,179	16	59,934,754	7
Minnesota	15,317	580,388	5	61,150	6,777,302	36	7,434,162	37
Mississippi	49,968	224,540	13,319	38,065	23,876,112	20	24,202,003	21
Missouri	47,045	2,219,916	83,074	573,456	25,603,462	18	28,526,955	18
Montana	122	55,632	0	18	2,954,698	49	3,010,470	51
Nebraska	393,386	231,735	3,978	241,664	9,958,597	32	10,829,361	33
Nevada	39,138	752,925	34,669	65,039	3,132,799	47	4,024,570	46
New Brunswick	17,811	454,497	0	47,765	5,747,597	39	6,267,670	39
New Hampshire	172	19,441	9,354	156,143	1,853,209	53	2,038,319	54
New Jersey	58,766	736,847	135,560	152,163	7,888,612	34	8,971,949	35
New Mexico	1,408	547,341	6	5,651	1,383,807	55	1,938,214	55
New York	209,104	684,524	180,463	2,371,055	15,912,708	25	19,357,853	23
Newfoundland and Labrador	0	43,675	0	0	831,760	57	875,435	57
North Carolina	1,094,012	954,553	33,742	112,862	49,067,725	9	51,262,893	11
North Dakota	2,187	860,533	0	2	3,123,749	48	3,986,471	47
Northern Marianas	0	0	0	0	2,527	65	2,527	65
Nova Scotia	31,137	101,490	903	391	5,238,245	40	5,372,166	40
Ohio	747,951	11,872,623	378,808	23,100,557	82,877,107	3	118,977,045	2
Oklahoma	28,789	664,703	426,533	2,955,885	7,113,841	35	11,189,751	32
Ontario	1,410,546	8,164,936	126,732	977,494	58,123,712	4	68,803,419	6
Oregon	17,163	385,047	207,241	486,165	9,623,828	33	10,719,445	34
Pennsylvania	578,197	22,064,423	74,095	4,764,609	46,664,687	10	74,146,011	5
Prince Edward Island	0	35,094	0	0	227,176	60	262,270	60
Puerto Rico	34,484	179,980	0	432	4,462,271	41	4,677,168	43
Quebec	456,105	3,959,194	71,201	1,013,404	17,462,054	24	22,961,959	22
Rhode Island	2,472	15,397	3,728	39,535	281,725	59	342,857	58
Saskatchewan	38,521	3,330,792	0	0	1,494,790	54	4,864,103	41
South Carolina	60,070	936,871	177,025	1,778,326	25,340,293	19	28,292,586	19
South Dakota	172	13,688	0	419	2,150,947	51	2,165,225	53
Tennessee	381,113	1,899,714	63,107	191,918	50,114,052	8	52,649,905	9
Texas	2,498,029	2,804,142	266,220	647,102	90,932,859	2	97,148,352	3
Utah	85,277	108,345	88,076	1,958,079	22,497,038	21	24,736,815	20
Vermont	900	2,792	113	1,308	72,975	62	78,089	62
Virgin Islands	0	0	0	0	287,929	58	287,929	59
Virginia	195,310	3,037,909	11,166	117,277	27,011,464	17	30,373,126	17
Washington	10,703	431,730	1,544	36,004	6,435,851	38	6,915,832	38
West Virginia	11,506	1,221,230	16,311	182,854	36,380,134	14	37,812,036	15
Wisconsin	894,319	4,434,366	91,930	1,566,128	11,797,638	29	18,784,381	26
Wyoming	52	87,077	0	159	4,402,096	42	4,489,384	44
Total	**16,781,187**	**147,630,519**	**4,449,048**	**58,138,820**	**1,273,863,312**		**1,500,862,886**	

* Off-site releases are omitted (adjusted) if the amount of off-site releases is also reported as an on-site releases by another facility within the state/province.

- On-site releases were the largest source of releases within the state or province for most jurisdictions, and the proportion of transfers to disposal both from facilities located outside the state or province and those located within its borders varied.
- Arizona had the largest loading (total releases within a state), with 129.6 million kg, because of the large on-site release reported by one facility (BHP Copper N.A. San Manuel Ops. in San Manuel, Arizona), which reported 111.2 million kg, primarily as on-site land disposal.
- Ohio had the second-largest total loading, with 119.0 million kg. Ohio received by far the largest transfers to disposal from facilities outside the state to sites within the state (23.5 million kg). The next largest was Michigan, with 6.2 million kg of transfers to disposal transferred into the state.
- Texas had the third-largest loading, with 97.1 million kg. Texas had the second-largest on-site releases (90.9 million kg).
- Indiana, fourth-ranked for loading, with 85.8 million kg, had the largest transfers from facilities within the state to other in-state locations—27.6 million kg of transfers to disposal.
- Pennsylvania ranked fifth, with 74.1 million kg, due to transfers to disposal from facilities within the state of 22.6 million kg.
- Ontario, the Canadian province with the largest loading, ranked sixth in North America, with 68.8 million kg, largely due to on-site releases of 58.1 million kg.
- Michigan had the next largest loading, with 59.9 million kg. In contrast to the other states with large loadings, transfers to disposal from facilities within Michigan were about the same as releases on-site at facilities in the state. Over 44 percent of its total loadings were transfers to disposal from facilities within Michigan to other sites in the state, while 46 percent of total loadings were releases at the reporting facilities.

8.3 1998–2002 Cross-Border Transfers

This section analyzes changes in materials sent across national borders from 1998 to 2002. It uses the dataset of 153 chemicals that NPRI and TRI reported in common from 1998 to 2002 (which does not include NPRI new chemicals, lead and its compounds, or mercury and its compounds).

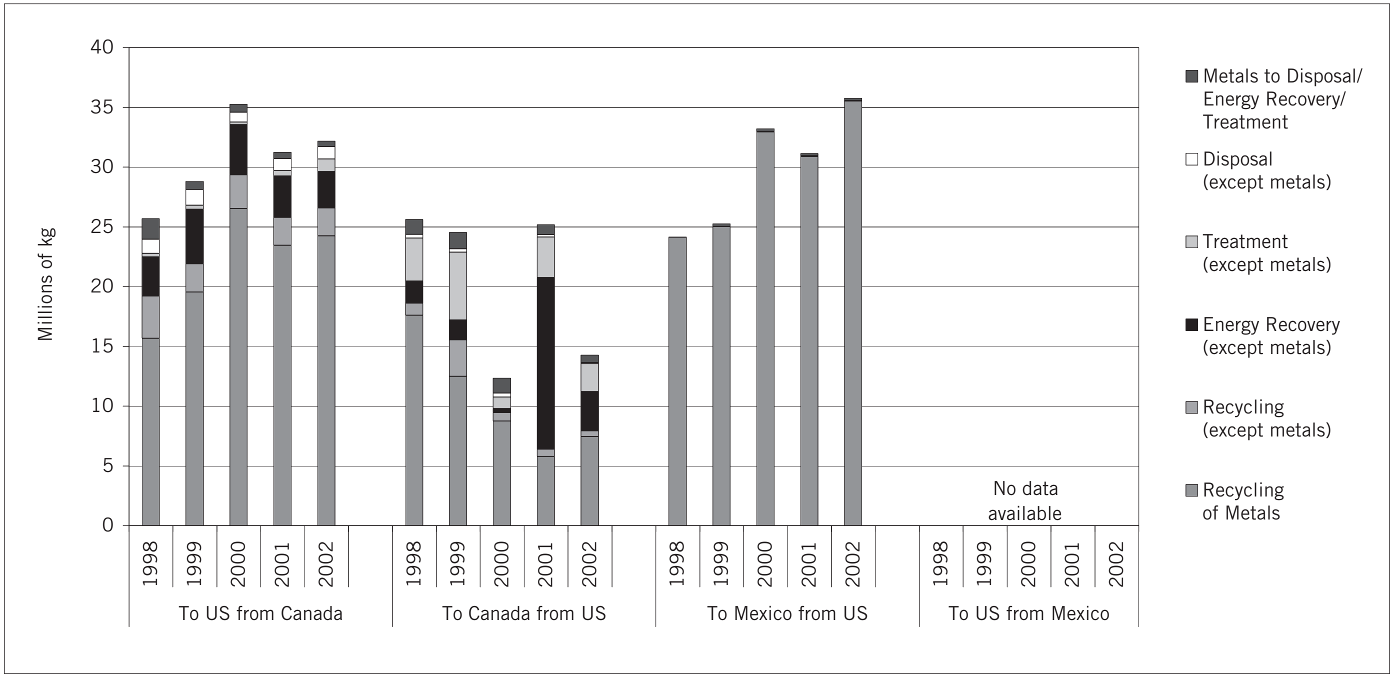
- Transfers from Canada to the United States increased from 25.7 million kg in 1998 to 32.2 million kg in 2002, an increase of 25 percent. There were increases in each time period except from 2000 to 2001. From 2001 to 2002, the increase was 3 percent.
- Although transfers from Canadian facilities to US sites increased by 25 percent, Canadian facilities increased their transfers to other Canadian sites by just 5 percent, and overall transfers, including those within Canada, increased by 8 percent.
- Throughout this period, most of the transfers from Canada to the United States were in the form of metals and their compounds to recycling.
- Transfers of the matched chemicals from US facilities to Canadian sites decreased by 44 percent, while cross-border transfers to Mexican sites increased by 48 percent. Overall transfers, including those within the United States, decreased by 5 percent.
- Transfers from the United States to Canada decreased from 25.6 million kg in 1998 to 14.3 million kg in 2002. Transfers from the United States to Canada were about one-half of the transfers from Canada to the United States in 2002.
- The amount of transfers from the United States to Canada varied substantially from year to year during this period, with a decrease of 12.2 million kg from 1999 to 2000, an increase of 12.8 million kg from 2000 to 2001, and a decrease of 10.9 million kg from 2001 to 2002.

Table 8–11. Total Off-site Transfers Within Country and Cross-Border, 1998–2002

	Total Transfers to Recycling/Energy Recovery/Treatment/Disposal								
	1998 (kg)	1999 (kg)	2000 (kg)	2001 (kg)	2002 (kg)	Change 2001–2002 kg	Change 2001–2002 %	Change 1998–2002 kg	Change 1998–2002 %
From Canadian Facilities	**187,294,024**	**190,249,010**	**172,771,332**	**168,576,412**	**201,942,798**	**33,366,386**	**20**	**14,648,774**	**8**
Within Canada	161,578,616	161,362,078	137,192,452	137,198,038	169,510,558	32,312,520	24	7,931,942	5
To United States	25,695,234	28,797,808	35,248,297	31,218,792	32,180,417	961,625	3	6,485,183	25
To Mexico	0	0	0	0	0	0	--	0	--
To Other Countries or Unknown	20,174	89,124	330,583	159,582	251,824	92,242	58	231,650	1,148
From US Facilities	**1,466,420,699**	**1,461,649,330**	**1,466,046,239**	**1,417,550,428**	**1,390,566,370**	**-26,984,058**	**-2**	**-75,854,330**	**-5**
Within United States	1,413,556,154	1,409,093,456	1,413,194,351	1,357,049,965	1,338,144,815	-18,905,149	-1	-75,411,338	-5
To Canada	25,623,552	24,530,138	12,348,595	25,188,948	14,263,407	-10,925,541	-43	-11,360,145	-44
To Mexico	24,153,844	25,246,461	33,207,913	31,142,949	35,767,808	4,624,859	15	11,613,964	48
To Other Countries or Unknown	3,087,150	2,779,275	7,295,380	4,168,566	2,390,339	-1,778,227	-43	-696,811	-23
From Mexican Facilities	Data not available.								

Note: Does not include transfers to sewage. Data on Mexico transfers to US or Canada not available for 1998–2002.
Does not include arsenic, cadmium, lead, mercury, vanadium and their compounds.

Figure 8–6. Change in Off-site Transfers to/from Canada, US and Mexico, 1998–2002



Note: Does not include transfers to sewage. Data on Mexico transfers to US or Canada not available for 1998–2002.
Does not include arsenic, cadmium, lead, mercury, vanadium and their compounds.

- Much of the variation in the amount of transfers from the United States to Canada was due to a change in transfers to energy recovery, which made up 3 percent of the total in 2000 but 57 percent in 2001. One facility, Petro-Chem Processing Group/Solvent Distillers Group in Detroit, Michigan, accounted for most of this change, reporting 14.2 million kg of transfers to energy recovery to Ontario facilities in 2001. Transfers of metals to recycling decreased in each year from 1998 to 2001, with an increase reported from 2001 to 2002.
- Transfers by TRI facilities to sites in Mexico increased from 24.2 million kg in 1998 to 35.8 million kg in 2002, an increase of 48 percent. There was a decrease from 2000 to 2001 after increases in each of the two prior years. Transfers to Mexico from TRI facilities increased by 15 percent in the most recent time period, 2001 to 2002.
- No data are available for transfers from Mexico to the United States or to Canada for the years 1998 to 2002.

8.3.1 1998–2002 Cross-Border Transfers by Industry

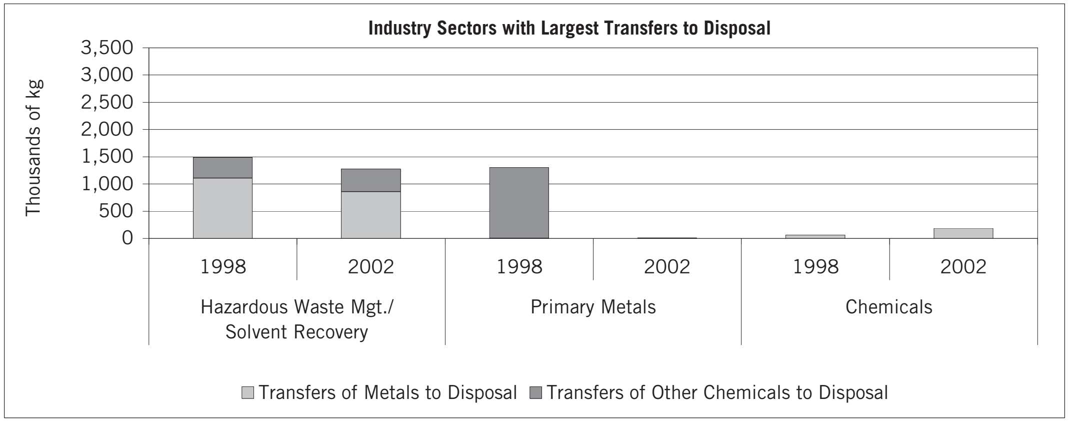
In NPRI, 17 sectors reported transfers to US sites. In TRI, 16 industry sectors reported transfers to Canadian sites in 1998 or 2002 though the sectors sending transfers differed.

- The Canadian primary metals sector, which had the largest transfers to the United States in both years, increased its transfers by 1.4 million kg (13 percent) from 1998 to 2002. Almost all of the transfers were metals for recycling. This industry reported an increase 30 percent in transfers to recycling (from 8.9 million kg to 11.6 million kg), but decreased its small amount of transfers to disposal. Transfers of zinc and its compounds sent to US sites increased by 4.9 million kg, but transfers copper and its compounds decreased by 2.7 million kg and transfers of aluminum decreased by 1.6 million kg.
- The Canadian fabricated metals sector reported the largest increase in cross-border transfers from 1998 to 2002—6.0 million kg, or over 130 percent. Almost all of the transfers were metals for recycling. This industry reported an increase of 120 percent in transfers to recycling and an increase of 583,000 kg in transfers to treatment from zero in 2002. Increases included almost 3.1 million kg of copper and its compounds and 2.3 million kg of zinc and its compounds.
- Canadian hazardous waste management facilities reported the largest decrease in cross-border transfers, a decline of over 870,000 kg. These facilities primarily transferred chemicals for energy recovery and to disposal, decreasing transfers to energy recovery and treatment by 12 percent and to disposal by 14 percent from 1998 to 2002. Decreases included 1.3 million kg of xylenes and 1.2 million kg of toluene.

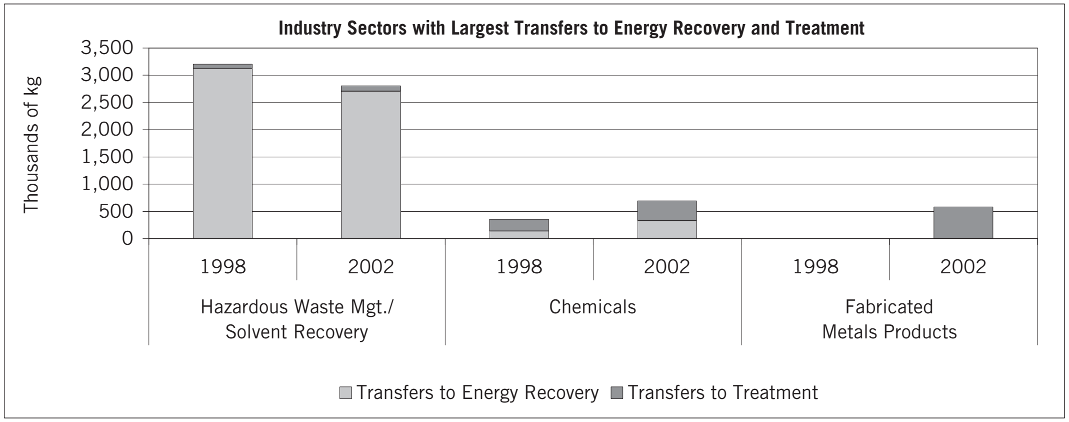
Table 8–12. NPRI Off-site Transfers from Canada to the US, by Industry, 1998–2002 (Ordered by Industry with Largest Transfers in 2002)

			Total Transfers to Recycling/Energy Recovery/Treatment/Disposal						
	US SIC		1998	1999	2000	2001	2002	Change 1998–2002	
Rank	Code	Industry	(kg)	(kg)	(kg)	(kg)	(kg)	kg	%
1	33	Primary Metals	10,251,619	6,529,130	12,744,032	12,150,350	11,613,926	1,362,307	13
2	34	Fabricated Metals Products	4,495,921	10,912,740	10,799,664	9,577,848	10,479,933	5,984,012	133
3	73	Hazardous Waste Mgt./Solvent Recovery	5,036,856	6,346,060	5,255,274	4,119,498	4,166,369	-870,487	-17
4	28	Chemicals	1,750,910	1,152,798	1,481,926	1,707,334	1,768,442	17,532	1
5	37	Transportation Equipment	1,459,822	1,585,107	2,183,969	986,976	1,249,605	-210,217	-14
6	27	Printing and Publishing	5,797	3,470	313,907	669,622	983,057	977,260	16,858
7	39	Misc. Manufacturing Industries	849,871	843,482	804,511	696,954	878,283	28,412	3
8	49	Electric Utilities	252,092	203,880	157,759	237,819	284,060	31,968	13
9	30	Rubber and Plastics Products	3,884	9,732	114,374	278,052	218,085	214,201	5,515
10	36	Electronic/Electrical Equipment	435,955	644,839	805,507	230,773	167,098	-268,857	-62
11	35	Industrial Machinery	174,494	185,172	193,943	79,270	143,190	-31,304	-18
12	29	Petroleum and Coal Products	774,450	241,417	300,598	367,536	106,898	-667,552	-86
13	20	Food Products	191,573	74,319	63,592	73,210	73,717	-117,856	-62
14	26	Paper Products	861	26,310	21,760	41,950	20,426	19,565	2,272
15	32	Stone/Clay/Glass Products	11,129	39,112	7,481	1,600	14,828	3,699	33
16	25	Furniture and Fixtures	0	0	0	0	12,500	12,500	--
17	22	Textile Mill Products	0	240	0	0	0	0	--
		Total	**25,695,234**	**28,797,808**	**35,248,297**	**31,218,792**	**32,180,417**	**6,485,183**	**25**

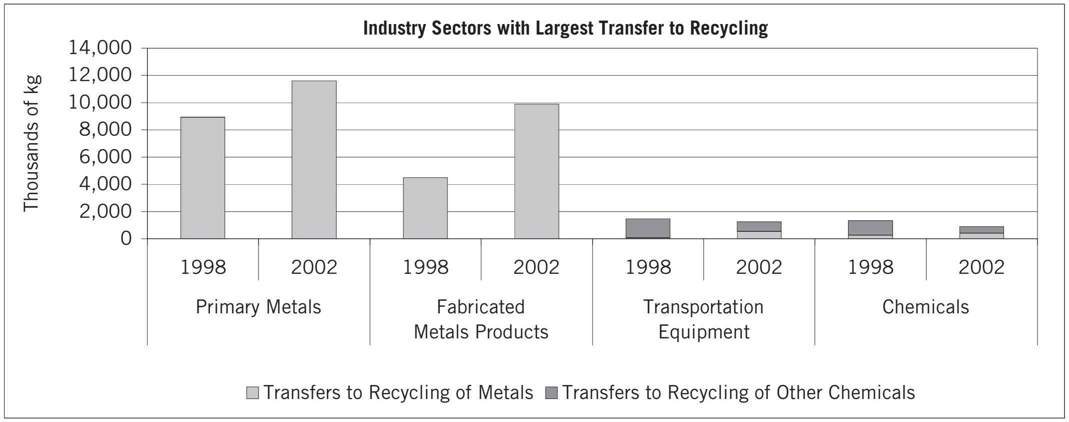
Figure 8–7. NPRI Off-site Transfers from Canada to the US, Industries with Largest Transfers, 1998 and 2002



Note: Transfers of Metals to Disposal include transfers to disposal, energy recovery and treatment.



Note: Does not include metals and their compounds.



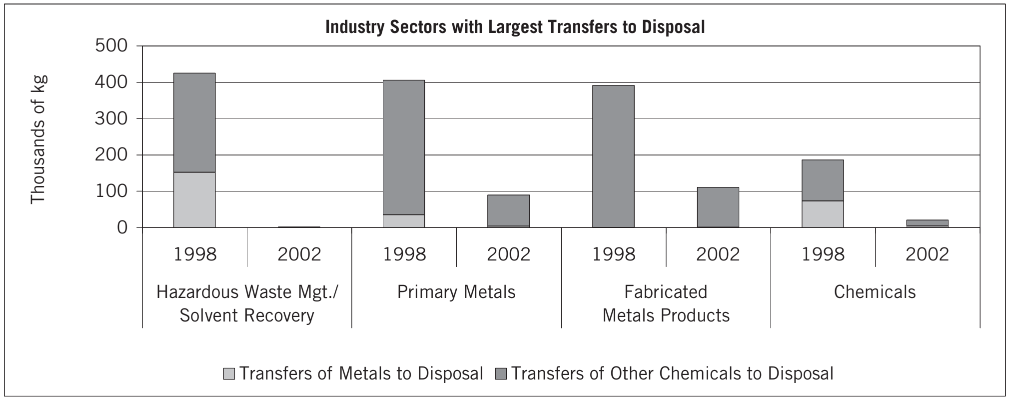
- US hazardous waste management facilities reported the largest transfers to Canada in 2002, but that represented a decrease of over 580,000 kg, or 11 percent. These facilities primarily transferred chemicals for energy recovery and treatment. The large increase, from 2000 to 2001, and subsequent decrease came in transfers to energy recovery reported by one facility (Petro-Chem Processing Group/Solvent Distillers Group in Detroit, Michigan), which reported transfers to energy recovery of 14.2 million kg in 2001 and 3.2 million in 2002.
- The sector with the largest transfers from US facilities to Canadian sites in 1998, the primary metals industry, dropped to third in 2002, with a decrease of 6.7 million kg, or 76 percent. Almost all of the transfers from these facilities were metals for recycling. This industry reported a decrease of 76 percent in transfers to recycling to Canadian sites. Decreases included a net decrease of 5.8 million kg of copper and its compounds
- US facilities reporting multiple 2-digit SIC codes reported the second-largest transfers to Canadian sites. Two facilities accounted for most of these transfers. The Wheatland Tube Co. in Wheatland, Pennsylvania (reporting under primary metals and fabricated metals SIC codes), sent over 907,000 kg of zinc and its compounds for recycling to Impex Trading Services in Calgary, Alberta, and the Dow Corning Corp. facility in Midland, Michigan (reporting under chemical manufacturer and measurement instruments SIC codes), sent 1.3 million kg for treatment (primarily xylenes and methanol) to the Clean Harbors facility in Corunna, Ontario.
- US hazardous waste facilities reported the largest transfers to disposal and transfers to energy recovery and treatment in 1998 to Canadian sites. Both types of transfers from these facilities had decreased by 99.5 percent or more by 2002.

Table 8–13. TRI Off-site Transfers from the US to Canada, by Industry, 1998–2002 (Ordered by Industry with Largest Transfers in 2002)

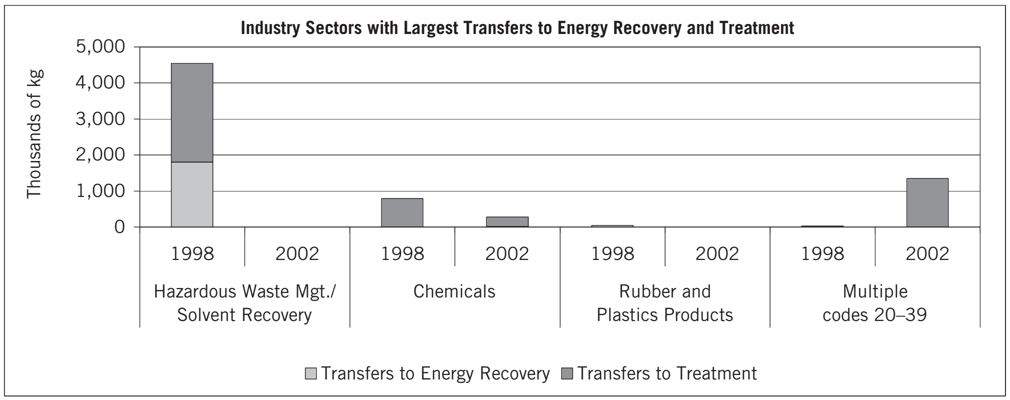
			Total Transfers to Recycling/Energy Recovery/Treatment/Disposal						
	US SIC		1998	1999	2000	2001	2002	Change 1998–2002	
Rank	Code	Industry	(kg)	(kg)	(kg)	(kg)	(kg)	kg	%
1	495/738	Hazardous Waste Mgt./Solvent Recovery	5,234,791	7,145,575	2,079,213	16,856,352	4,654,320	-580,471	-11
2	--	Multiple codes 20–39*	5,945,752	607,029	529,822	1,401,203	2,410,954	-3,534,798	-59
3	33	Primary Metals	8,867,427	9,161,022	3,393,431	1,957,854	2,130,421	-6,737,006	-76
4	28	Chemicals	3,214,742	3,139,116	2,277,761	1,482,021	1,773,054	-1,441,688	-45
5	34	Fabricated Metals Products	690,761	779,005	1,096,400	1,374,636	1,593,839	903,078	131
6	37	Transportation Equipment	519,337	2,639,707	1,835,017	745,702	854,656	335,318	65
7	36	Electronic/Electrical Equipment	504,061	595,183	604,414	438,479	437,538	-66,523	-13
8	26	Paper Products	284,067	99,256	204,683	240,080	118,980	-165,086	-58
9	38	Measurement/Photographic Instruments	199,320	112,878	181,848	280,685	114,288	-85,031	-43
10	30	Rubber and Plastics Products	70,465	122,492	30,690	42,386	100,322	29,858	42
11	29	Petroleum and Coal Products	22,586	42,986	38,748	57,172	56,562	33,976	150
12	35	Industrial Machinery	26,271	30,187	32,982	40,616	15,839	-10,433	-40
13	491/493	Electric Utilities	0	6,742	23	1,859	2,054	2,054	--
14	39	Misc. Manufacturing Industries	8,664	9,830	11,630	8,300	560	-8,104	-94
15	32	Stone/Clay/Glass Products	35,195	39,130	31,932	261,601	18	-35,176	-100
16	23	Apparel and Other Textile Products	113	0	0	0	0	-113	-100
		Total	**25,623,552**	**24,530,138**	**12,348,595**	**25,188,948**	**14,263,407**	**-11,360,145**	**-44**

* Multiple codes reported only in TRI.

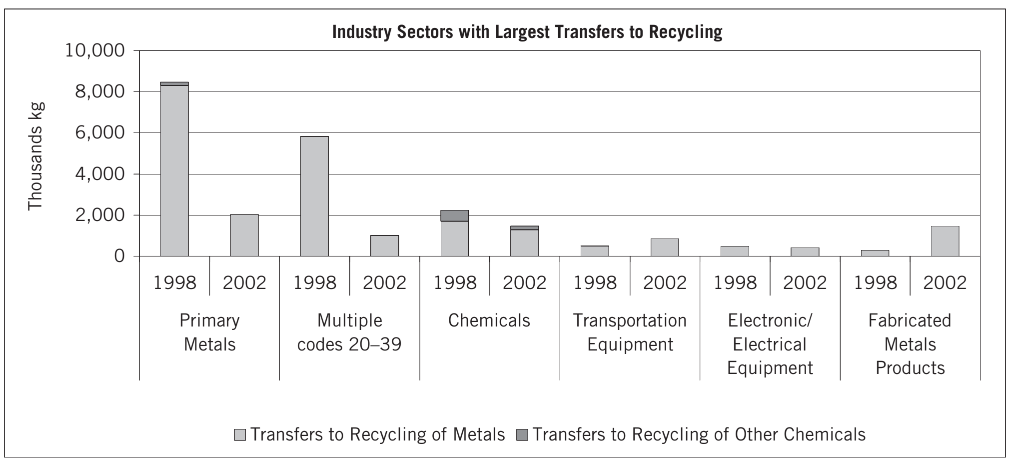
Figure 8–8. TRI Off-site Transfers from the US to Canada, Industries with Largest Transfers, 1998 and 2002



Note: Transfers of Metals to Disposal include transfers to disposal, energy recovery and treatment.



Note: Does not include metals and their compounds.



9

Special Analyses: Chemicals Linked to Cancer/Birth Defects

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Key Findings

- This chapter presents data for two groups of chemicals with health effects: 1) known or suspected carcinogens and 2) chemicals that are linked to cancer, birth defects or other reproductive harm (California Proposition 65 chemicals).
- Known or suspected carcinogens comprised 10 percent of total releases on- and off-site of all matched chemicals in 2002. Releases of these known or suspected carcinogens decreased by 26 percent from 1998 to 2002, compared to 11 percent for all matched chemicals. Total releases of carcinogens reported by NPRI facilities decreased by 23 percent, and those by TRI facilities decreased by 26 percent.
- Chemicals linked to cancer, birth defects and other reproductive harm (as identified under California Proposition 65) accounted for 12 percent of total releases on- and off-site of all matched chemicals in 2002. These Proposition 65 chemicals decreased by 31 percent from 1998 to 2002, compared to 11 percent for all matched chemicals. Total releases reported by NPRI facilities decreased by 25 percent and those by TRI facilities decreased by 32 percent.
- Two chemicals, arsenic and cadmium and their compounds, considered to be known or suspected carcinogens and linked to birth defects or other reproductive harm on the California Proposition 65 list, are no longer in the matched data set. The reporting threshold for both of these categories of substances was lowered in NPRI starting with the 2002 reporting year. TRI did not change the reporting threshold so that reporting between NPRI and TRI is no longer comparable.
- Lowering the NPRI reporting threshold for arsenic and cadmium greatly increased the number of facilities reporting and increased the amount of releases reported by about 10 percent. About half of the 212 NPRI facilities reporting on arsenic and its compounds in 2002 reported for the first time. For cadmium, 87 percent of the 281 facilities reporting cadmium did so for the first time in 2002.

9.1 Introduction

Chapter 9 examines releases and transfers in North America for two groups of chemicals with health effects. The two groups of chemicals of special concern are 1) known or suspected carcinogens, a list derived from a combination of substances identified under the International Agency for Research on Cancer (IARC) and by the US National Toxicology Program (NTP), and 2) chemicals linked to cancer, birth defects and reproductive harm (chemicals identified under California Proposition 65).

For two other groups of chemicals of concern that can be examined, metals and their compounds and Canadian Environmental Protection Act (CEPA) Toxics, see the *Taking Stock* web site at <http://www.cec.org/takingstock>. Using the query builder function, users can generate data reports that look specifically at these groups of substances, as well as the carcinogens and California Proposition chemicals examined in this chapter.

As explained in **Chapter 2**, this chapter analyzes data for industries and chemicals that must be reported in both the United States and Canada (the matched data set). Comparable Mexican data are not available for the 2002 reporting year.

Three chemicals (arsenic, cadmium and chromium and their compounds) are no longer included in the analyses in this chapter. Arsenic and cadmium and their compounds are no longer in the matched data set because NPRI lowered the reporting threshold for the entire categories of these substances from 10 tonnes to 50 kg manufactured, processed or otherwise used in a calendar year. TRI reporting remains at the higher threshold so the substances are no longer comparable. Chromium and its compounds are not included as a carcinogen because they are no longer reported as a single category under NPRI. NPRI reports on hexavalent chromium (the chromium compound which is carcinogenic) separately from other chromium compounds. Under TRI, all chromium compounds are reported as a single amount.

9.2 Releases On- and Off-site of Known or Suspected Carcinogens

Chemicals can have different health effects. In this section, chemicals that are known or suspected to cause cancer are analyzed. Of the 203 chemicals in the matched data set, 55 are known or suspected carcinogens. Only one, Michler's ketone, had no reports in 2002. A chemical is included as a known or suspected carcinogen if it is listed by the International Agency for Research on Cancer (IARC) <http://www.iarc.fr/> or by the US National Toxicology Program (NTP) <http://ntp-server.niehs.nih.gov/>. Substances classified under IARC as carcinogenic to humans (Group 1), probably carcinogenic to humans (Group 2A), and possibly carcinogenic to humans (Group 2B) are included. Under the US National Toxicology Program, substances are classified as either known to be carcinogenic or may reasonably be anticipated to be carcinogenic.

Some substances, such as metal compounds, are reported as one category to TRI and NPRI, and not by individual compound. A substance is considered a carcinogen if the substance or any of its compounds is a carcinogen under IARC or NTP. The one exception is chromium and its compounds: this group is not included as a carcinogen because it is no longer reported as a single category under NPRI. NPRI reports on hexavalent chromium (the chromium compound which is listed as carcinogenic) separately from other chromium compounds. Under TRI, all chromium compounds are reported as a single amount. In the matched data set, for NPRI, total releases for hexavalent chromium were 321,403 kg and for chromium and its other compounds total releases were 2.7 million kg. For TRI, total releases of chromium and its compounds were 27.3 million kg. These amounts are not included in this section on carcinogens.

Table 9–1. On- and Off-site Releases of Known or Suspected Carcinogens, 2002

				On-site Releases					
CAS Number		Chemical	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases kg	Rank
--	m,p,t	Lead (and its compounds)	8,783	960,623	67,179	139,038	23,644,857	24,811,698	1
100-42-5		Styrene	1,720	23,511,104	1,603	72,607	91,484	23,679,687	2
--	m,p,t	Nickel (and its compounds)	3,809	993,502	124,136	241,223	10,426,005	11,787,505	3
50-00-0	p	Formaldehyde	938	6,403,186	194,838	3,584,498	57,231	10,242,135	4
75-07-0	p,t	Acetaldehyde	363	6,715,876	189,359	325,776	6,886	7,237,897	5
75-09-2	p,t	Dichloromethane	578	6,029,692	2,171	138,203	2,006	6,173,486	6
107-13-1	p,t	Acrylonitrile	117	314,133	418	4,941,021	184	5,255,814	7
79-01-6	p,t	Trichloroethylene	525	4,316,998	262	63,578	104	4,382,912	8
100-41-4	p	Ethylbenzene	1,775	3,678,931	4,750	431,231	4,719	4,126,827	9
1332-21-4	p,t	Asbestos (friable)	103	288	0	0	2,538,772	2,539,060	12
79-06-1	p	Acrylamide	86	5,712	75	3,917,201	0	3,923,121	10
71-43-2	p,t	Benzene	1,079	3,378,520	9,619	374,089	21,142	3,785,976	11
--	m,p	Cobalt (and its compounds)	772	65,952	20,999	20,034	1,999,561	2,107,477	13
108-05-4		Vinyl acetate	195	1,567,683	498	207,937	4,176	1,781,642	14
127-18-4	p,t	Tetrachloroethylene	381	1,078,273	397	67,609	65,543	1,212,411	15
106-99-0	p,t	1,3-Butadiene	224	952,951	945	17,395	400	971,929	16
67-66-3	p	Chloroform	119	640,277	8,618	84,859	28,309	762,174	17
117-81-7	p,t	Di(2-ethylhexyl) phthalate	364	292,662	614	0	12,140	305,588	20
123-91-1	p	1,4-Dioxane	54	48,629	34,068	0	863	83,560	25
75-01-4	p,t	Vinyl chloride	64	316,300	263	63,248	2	379,823	18
107-06-2	p,t	1,2-Dichloroethane	92	213,423	2,011	96,514	277	312,226	19
56-23-5	p,t	Carbon tetrachloride	61	201,896	145	78,117	21	280,603	21
75-21-8	p,t	Ethylene oxide	162	196,313	1,988	0	446	198,823	22
75-56-9	p	Propylene oxide	114	132,553	8,975	1,134	35,698	178,362	23
98-95-3	p	Nitrobenzene	27	30,838	24	107,510	42	138,414	24
--	t	Polychlorinated alkanes (C10 to C13)	61	3,547	115	0	0	3,662	39
140-88-5	p	Ethyl acrylate	109	56,611	29	0	11	56,759	27
106-89-8	p	Epichlorohydrin	73	75,618	6,268	0	1,246	83,134	26
106-46-7	p	1,4-Dichlorobenzene	27	49,068	153	3,987	4	53,314	28
26471-62-5	p	Toluenediisocyanate (mixed isomers)	196	17,169	258	0	8,534	26,261	31
101-77-9	p	4,4'-Methylenedianiline	22	5,649	50	25,850	0	31,550	30
302-01-2	p	Hydrazine	58	1,024	2,163	29,932	29	33,150	29
120-80-9	p	Catechol	127	4,861	7,677	0	594	13,132	32
139-13-9	p	Nitrilotriacetic acid	18	1,607	0	399	6,419	8,426	35
584-84-9		Toluene-2,4-diisocyanate	54	1,832	0	0	0	1,877	42
62-56-6	p	Thiourea	24	766	164	9,977	113	11,021	33
79-46-9	p	2-Nitropropane	7	8,824	117	0	0	8,941	34
64-67-5	p	Diethyl sulfate	31	7,947	0	0	0	7,947	36
100-44-7	p	Benzyl chloride	43	4,115	77	0	152	4,382	37
77-78-1	p	Dimethyl sulfate	30	3,715	0	0	0	3,715	38
96-45-7	p	Ethylene thiourea	14	53	2	0	0	55	49
563-47-3	p	3-Chloro-2-methyl-1-propene	3	3,530	0	0	0	3,530	40
106-88-7		1,2-Butylene oxide	18	2,657	142	0	3	2,802	41
121-14-2	p	2,4-Dinitrotoluene	10	93	3	0	0	196	46
101-14-4	p	4,4'-Methylenebis(2-chloroaniline)	21	3	0	0	0	8	51
91-08-7		Toluene-2,6-diisocyanate	23	260	0	0	0	261	45
67-72-1	p	Hexachloroethane	21	411	3	139	0	552	44
95-80-7	p	2,4-Diaminotoluene	8	569	2	0	0	572	43
606-20-2	p	2,6-Dinitrotoluene	4	53	0	0	0	54	50
94-59-7	p	Safrole	3	113	0	0	0	113	47
115-28-6	p	Chlorendic acid	2	2	0	0	0	2	53
7758-01-2	p	Potassium bromate	1	113	0	0	0	113	48
612-83-9	p	3,3'-Dichlorobenzidine dihydrochloride	13	3	0	0	0	3	52
96-09-3	p	Styrene oxide	1	2	0	0	0	2	54
		Subtotal	**23,527**	**62,296,533**	**691,182**	**15,043,106**	**38,957,973**	**117,014,683**	
		% of Total	**28**	**8**	**1**	**19**	**12**	**9**	
		Total	**84,654**	**752,310,204**	**106,556,614**	**80,719,282**	**334,153,615**	**1,273,863,312**	

Note: Canada and US data only. Mexico data not available for 2002. A chemical (and its compounds) is included if the chemical or any of its compounds is listed by the International Agency for Research on Cancer (IARC: Group 1, 2A or 2B) or the US National Toxicology Program (NTP).
m = Metal and its compounds.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.

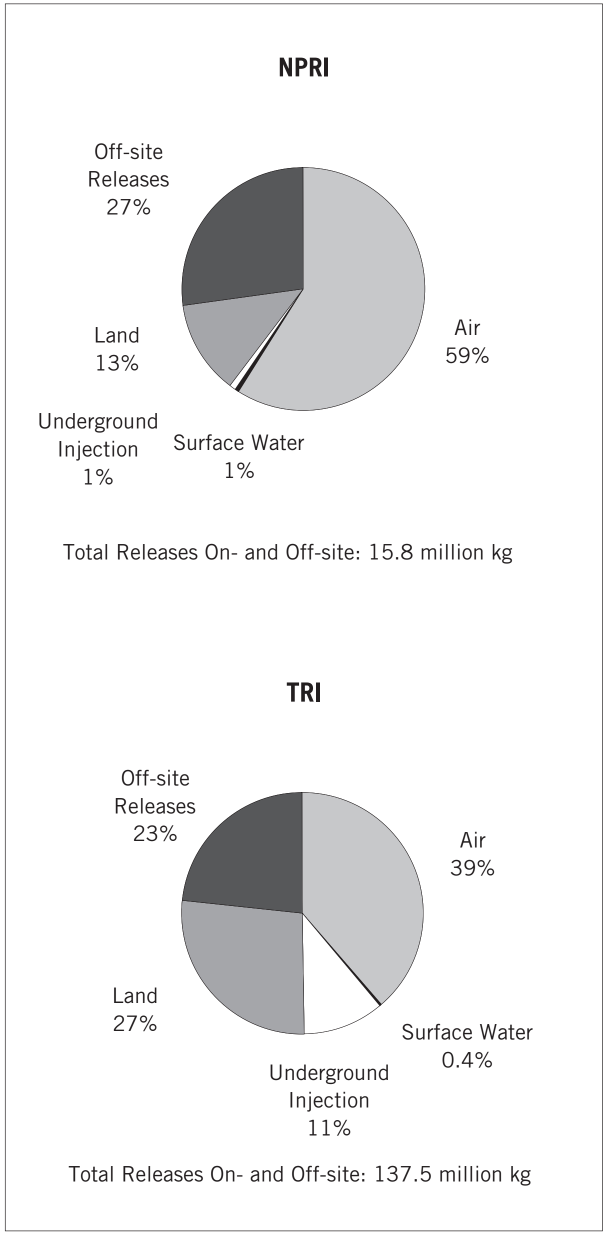
Table 9–1. (*continued*)

Off-site Releases: Disposal (except metals) (kg)	Off-site Releases: Disposal of Metals (kg)	Total Off-site Releases kg	Rank	Total Releases: Total Reported Releases On- and Off-site kg	Rank	Adjustment Component* (kg)	Total Releases (adjusted)** kg	Rank
0	23,542,903	23,542,903	1	48,354,601	1	5,038,351	43,316,249	1
852,288	0	852,288	4	24,531,975	2	305	24,531,670	2
0	7,745,644	7,745,644	2	19,533,149	3	464,084	19,069,065	3
284,563	0	284,563	8	10,526,698	4	3,631	10,523,068	4
1,560	0	1,560	31	7,239,457	5	0	7,239,457	5
84,024	0	84,024	12	6,257,510	6	1,769	6,255,741	6
8,772	0	8,772	22	5,264,586	7	0	5,264,586	7
77,446	0	77,446	13	4,460,358	8	464	4,459,894	8
71,759	0	71,759	14	4,198,586	9	18,094	4,180,492	9
1,617,246	0	1,617,246	3	4,156,306	10	17,997	4,138,309	10
2,763	0	2,763	29	3,925,884	11	0	3,925,884	11
96,746	0	96,746	11	3,882,722	12	24,711	3,858,012	12
0	551,196	551,196	5	2,658,673	13	10,560	2,648,113	13
49,158	0	49,158	16	1,830,800	14	3,809	1,826,991	14
174,237	0	174,237	9	1,386,647	15	1,243	1,385,405	15
1,235	0	1,235	34	973,164	16	0	973,164	16
13,612	0	13,612	20	775,785	17	68	775,718	17
386,755	0	386,755	7	692,343	18	0	692,343	18
437,250	0	437,250	6	520,809	19	0	520,809	19
167	0	167	43	379,991	20	0	379,991	20
13,849	0	13,849	18	326,076	21	9	326,067	21
3,852	0	3,852	26	284,455	22	35	284,420	22
3,380	0	3,380	28	202,203	23	0	202,203	23
6,262	0	6,262	24	184,624	24	0	184,624	24
6,727	0	6,727	23	145,141	25	1,527	143,614	25
107,863	0	107,863	10	111,526	27	29	111,496	26
60,269	0	60,269	15	117,028	26	9,700	107,328	27
1,560	0	1,560	32	84,694	28	0	84,694	28
605	0	605	38	53,920	29	0	53,920	29
14,580	0	14,580	17	40,840	30	2,359	38,482	30
2,712	0	2,712	30	34,262	31	0	34,262	31
86	0	86	46	33,236	32	0	33,236	32
13,635	0	13,635	19	26,766	33	0	26,766	33
5,022	0	5,022	25	13,447	34	0	13,447	34
10,566	0	10,566	21	12,442	35	0	12,442	35
36	0	36	48	11,056	36	0	11,056	36
239	0	239	41	9,180	37	0	9,180	37
0	0	0	50	7,947	38	0	7,947	38
1,457	0	1,457	33	5,839	39	0	5,839	39
119	0	119	44	3,834	40	0	3,834	40
3,592	0	3,592	27	3,647	41	0	3,647	41
0	0	0	51	3,530	42	0	3,530	42
0	0	0	52	2,802	43	0	2,802	43
1,080	0	1,080	36	1,276	44	0	1,276	44
1,092	0	1,092	35	1,100	45	0	1,100	45
656	0	656	37	917	46	0	917	46
342	0	342	40	895	47	0	895	47
38	0	38	47	610	48	0	610	48
388	0	388	39	441	49	0	441	49
116	0	116	45	229	50	0	229	50
190	0	190	42	193	51	0	193	51
0	0	0	53	113	52	0	113	52
1	0	1	49	4	53	0	4	53
0	0	0	54	2	54	0	2	54
4,419,896	**31,839,743**	**36,259,639**		**153,274,322**		**5,598,743**	**147,675,579**	
18	**13**	**13**		**10**		**14**	**10**	
24,716,457	**244,704,667**	**269,421,125**		**1,543,284,437**		**41,028,398**	**1,502,256,039**	

* Off-site releases also reported as on-site releases by another NPRI or TRI facility. This amount is subtracted from total reported releases on- and off-site to get total releases (adjusted).

** Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

Figure 9–1. Releases On- and Off-site of Known or Suspected Carcinogens, NPRI and TRI, 2002



9.2.1 Releases On- and Off-site of Carcinogens, 2002

- In 2002, 147.7 million kg of known or suspected carcinogens were released on- and off-site. This represented 10 percent of all releases on- and off-site in North America in 2002.
- Lead and its compounds were released in the largest amounts of all known or suspected carcinogens, 43.3 million kg. Lead had the largest off-site releases, with 23.5 million kg, and the largest on-site land releases, with 23.6 million kg. Lead and inorganic lead compounds are classified as a possible carcinogen to humans under IARC (Group 2B).
- Styrene was the carcinogen with the largest on-site air releases, with 23.5 million kg. Styrene is classified as possible carcinogen to humans under IARC (Group 2B).
- Formaldehyde was the carcinogen with the largest on-site surface water discharges, with almost 195,000 kg. Formaldehyde is classified as probably carcinogenic in humans under IARC (Group 2A) and may reasonably be anticipated to be carcinogenic under NTP.
- NPRI facilities reported 15.8 million kg (10 percent of the total reported releases of carcinogens in North America) and TRI facilities reported 137.5 million kg of carcinogens released on- and off-site (90 percent of the total reported releases) in 2002.
- Air emissions represented a higher percentage of total releases for NPRI facilities (59 percent) than for TRI facilities (39 percent). Consequently, NPRI accounted for 15 percent of all air releases of carcinogens, while TRI accounted for 85 percent. Similarly, NPRI accounted for 12 percent and TRI for 88 percent of off-site releases (transfers mainly to landfills). On the other hand, TRI accounted for 95 percent and NPRI for 5 percent of on-site land releases.

9.2.2 Facilities with the Largest Releases of Carcinogens, 2002

Facilities with Largest Total Releases, 2002

- The 10 NPRI facilities with the largest total reported releases of known or suspected carcinogens in the matched data set accounted for 22 percent of the 15.8 million kg reported by all NPRI facilities for 2002. These 10 facilities accounted for 57 percent of on-site land releases, 28 percent of off-site releases (transfers to disposal), 20 percent of on-site surface water discharges and 12 percent of on-site air releases.
- The NPRI facility with the largest total reported releases of known or suspected carcinogens was the Clean Harbors Canada Lambton Facility in Corunna, Ontario. This hazardous waste management facility reported on-site land disposal of 1.2 million kg, primarily of lead and its compounds. Lead and inorganic lead compounds are classified as a possible carcinogen to humans under IARC (Group 2B).
- The primary metals facility Noranda Brunswick Smelter in Belledune, New Brunswick, reported the second-largest total releases of carcinogens in NPRI, with over 479,000 kg, mainly of lead and its compounds transferred off-site for disposal.
- The 10 TRI facilities with the largest total reported releases of known or suspected carcinogens in the matched data set accounted for 19 percent of the 137.5 million kg reported by all TRI facilities. Their releases were primarily in the form of land disposal on- and off-site and on-site underground injection.
- The TRI facility with the largest total releases of carcinogens was the chemical manufacturer Solutia – Chocolate Bayou in Alvin, Texas, reporting 5.1 million kg of on-site underground injection, mainly of acrylonitrile. Acrylonitrile is classified as a possible carcinogen to humans under IARC (Group 2B) and may reasonably be anticipated to be carcinogenic under NTP.

Table 9–2. The 10 NPRI Facilities with the Largest Total Releases of Known or Suspected Carcinogens, 2002

			SIC Codes			On-site Releases				
Rank	Facility	City, Province	Canada	US	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Clean Harbors Canada Inc., Lambton Facility	Corunna, ON	49	495/738	4	5	0	0	1,155,000	1,155,005
2	Noranda Inc, Brunswick Smelter	Belledune, NB	29	33	1	8,550	107	0	0	8,657
3	IPSCO Saskatchewan Inc., Regina Plant Site, IPSCO Inc.	Regina, SK	29	33	2	3,191	0	0	0	3,231
4	Stelco Inc., Stelco Hamilton	Hamilton, ON	29	33	6	180,680	437	0	0	181,607
5	Vitafoam Products Canada Ltd., Toronto	Downsview, ON	16	30	2	265,340	0	0	0	265,340
6	Weyerhaeuser Company Limited, Miramichi OSB	Miramichi, NB	25	24	3	199,541	0	0	0	199,541
7	Slater Stainless Corp., Aciers Inoxydables Atlas, Slater Steel Inc.	Sorel-Tracy, QC	29	33	3	15,722	200	0	0	15,922
8	Inco Limited, Thompson Operations	Thompson, MB	29	33	3	164,280	21,500	0	0	185,780
9	Sandvik Materials Technology, Tube Production Unit	Arnprior, ON	29	33	1	185,186	0	0	0	185,186
10	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33	6	78,024	250	0	4	78,278
	Subtotal				**31**	**1,100,519**	**22,494**	**0**	**1,155,004**	**2,278,547**
	% of Total				**2**	**12**	**20**	**0**	**57**	**20**
	Total for NPRI Known or Suspected Carcinogens in matched database				**1,798**	**9,282,690**	**112,899**	**99,323**	**2,009,171**	**11,529,973**

Note: The data are estimates of releases and transfers of chemicals as reported by facilities and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.
A chemical (and its compounds) is included if the chemical or any of its compounds is listed by the International Agency for Research on Cancer (IARC: Group 1, 2A or 2B) or the US National Toxicology Program (NTP).

Table 9–3. The 10 TRI Facilities with the Largest Total Releases of Known or Suspected Carcinogens, 2002

					On-site Releases				
Rank	Facility	City, State	US SIC Code	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Solutia - Chocolate Bayou	Alvin, TX	28	6	34,376	150	5,056,721	2	5,091,249
2	BHP Copper N.A. San Manuel Ops.	San Manuel, AZ	33	2	5	2	45,391	3,129,267	3,174,664
3	National Plastics Color Inc.	Valley Center, KS	30 and 28	1	0	0	0	0	0
4	Clean Harbors of Connecticut Inc., Clean Harbors Inc.	Bristol, CT	495/738	2	0	0	0	0	0
5	Chemical Waste Management Inc., Waste Management Inc.	Kettleman City, CA	495/738	8	176	0	0	2,525,703	2,525,879
6	Sanders Lead Co. Inc.	Troy, AL	33	1	2,803	104	0	2,404,617	2,407,524
7	Monsanto - Luling	Luling, LA	28	2	17,188	1,451	2,131,918	0	2,150,558
8	BP Chemicals Green Lake Facility, BP America Inc.	Port Lavaca, TX	28	5	6,371	0	1,917,423	0	1,923,794
9	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT	33	3	4,172	399	0	1,837,280	1,841,851
10	ASARCO Inc. Ray Complex Hayden Smelter & Concentrator, Americas Mining Corp.	Hayden, AZ	33	3	3,972	0	0	1,626,893	1,630,866
	Subtotal			**33**	**69,063**	**2,106**	**9,151,454**	**11,523,762**	**20,746,385**
	% of Total			**0.2**	**0.1**	**0.4**	**61**	**31**	**20**
	Total for TRI Known or Suspected Carcinogens in matched database			**21,729**	**53,013,843**	**578,282**	**14,943,783**	**36,948,802**	**105,484,710**

Note: The data are estimates of releases and transfers of chemicals as reported by facilities and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.
A chemical (and its compounds) is included if the chemical or any of its compounds is listed by the International Agency for Research on Cancer (IARC: Group 1, 2A or 2B) or the US National Toxicology Program (NTP).

Table 9–2. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total On-site and off-site Releases Reported (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
1	0	0	0	1,155,005	Lead and compounds (land)
2	0	470,566	470,566	479,223	Lead and compounds (transfers of metals)
3	0	330,552	330,552	333,783	Lead and compounds (transfers of metals)
4	116,000	0	116,000	297,607	Benzene (air), Asbestos (transfers to disposal)
5	0	0	0	265,340	Dichloromethane (air)
6	0	0	0	199,541	Formaldehyde, Acetaldehyde (air)
7	0	171,310	171,310	187,232	Nickel and compounds (transfers of metals)
8	0	0	0	185,780	Nickel and compounds (air)
9	0	0	0	185,186	Trichloroethylene (air)
10	21,800	81,301	103,101	181,379	Benzene (air), Lead and compounds (transfers of metals)
	137,800	**1,053,729**	**1,191,529**	**3,470,076**	
	11	**35**	**28**	**22**	
	1,271,803	**3,009,229**	**4,281,032**	**15,811,006**	

Table 9–3. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total Reported Releases On-site and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
1	282	0	282	5,091,531	Acrylonitrile (UIJ)
2	0	132	132	3,174,796	Nickel and compounds (land)
3	0	2,594,882	2,594,882	2,594,882	Lead and compounds (transfers of metals)
4	0	2,578,545	2,578,545	2,578,545	Lead and compounds (transfers of metals)
5	7	124	130	2,526,010	Lead and compounds, Asbestos (land)
6	0	19	19	2,407,543	Lead and compounds (land)
7	0	0	0	2,150,558	Formaldehyde (UIJ)
8	0	78	78	1,923,872	Acrylamide (UIJ)
9	0	701	701	1,842,552	Lead and compounds (land)
10	0	19	19	1,630,884	Lead and compounds (land)
	288	**5,174,499**	**5,174,787**	**25,921,172**	
	0.01	**18**	**16**	**19**	
	3,148,093	**28,830,514**	**31,978,606**	**137,463,316**	

UIJ = underground injection.

- The primary metals facility BHP Copper in San Manuel, Arizona, reported 3.2 million kg of carcinogens, mainly of nickel and its compounds landfilled on-site. Nickel is classified as a possible carcinogen to humans under IARC (Group 2B) and may reasonably be anticipated to be carcinogenic under NTP. Certain nickel compounds are classified as carcinogenic to humans (Group 1) under IARC and may reasonably be anticipated to be carcinogenic under NTP.
- While there were seven primary metals facilities among the 10 NPRI facilities with the largest carcinogen releases, the TRI facilities included four primary metals facilities and three chemical manufacturers.

Facilities with Largest Air and Water Releases, 2002

- Among the 10 NPRI facilities with the largest air releases of known or suspected carcinogens, there were four rubber and plastics manufacturers, four primary metals facilities and two lumber and wood products manufacturers. These 10 facilities accounted for 19 percent of all NPRI air releases of carcinogens in 2002.
- The Vitafoam Products Canada, Toronto facility in Downsview, Ontario, reported the largest on-site air releases of carcinogens in NPRI, with over 265,000 kg in 2002. Dichloromethane was the primary carcinogen released to the air by this rubber and plastics products manufacturer. Dichloromethane is classified as possibly carcinogenic to humans under IARC (Group 2B) and may reasonably be anticipated to be carcinogenic under NTP.
- The lumber and wood products Weyerhauser facility in Miramichi, New Brunswick, reported the second-largest air releases of carcinogens in NPRI, with over 199,500 kg. Formaldehyde was the primary carcinogen released to the air by this facility. Formaldehyde is classified as probably carcinogenic to humans under IARC (Group 2A) and as may reasonably be anticipated to be carcinogenic under NTP.
- Among the 10 NPRI facilities with the largest surface water discharges of known or suspected carcinogens in 2002, nine were paper products manufacturers and one was a primary metals facility. These 10 facilities accounted for 70 percent of all NPRI surface water discharges of carcinogens in 2002.
- The Irving Pulp and Paper facility in Saint John, New Brunswick, reported the largest surface water discharges of carcinogens in NPRI, with 23,400 kg. Formaldehyde and acetaldehyde were the carcinogens released to surface waters in the largest amounts from this facility. Under IARC, formaldehyde is classified as probably carcinogenic to humans under IARC (Group 2A) and acetaldehyde is classified as possibly carcinogenic to humans (Group 2B). Under NTP, both of these chemicals are classified as may reasonably be anticipated to be carcinogenic.
- The primary metals facility Inco Limited in Thompson, Manitoba, reported the second-largest surface water discharges of carcinogens in NPRI, with 21,500 kg, mainly of nickel and its compounds. Under IARC, nickel is classified as possibly carcinogenic to humans (Group 2B) and certain nickel compounds are classified as carcinogenic to humans (Group 1). Nickel and certain nickel compounds are classified under

Table 9–4. The 10 NPRI Facilities with the Largest Air Releases of Known or Suspected Carcinogens, 2002

Rank	Facility	City, Province	SIC Codes Canada	SIC Codes US	Number of Forms	On-site Air Releases (kg)	Major Chemicals Reported (chemicals accounting for more than 70% of total reported amounts from the facility)
1	Vitafoam Products Canada Ltd., Toronto	Downsview, ON	16	30	2	265,340	Dichloromethane
2	Weyerhaeuser Company Limited, Miramichi OSB	Miramichi, NB	25	24	3	199,541	Formaldehyde
3	Sandvik Materials Technology, Tube Production Unit	Arnprior, ON	29	33	1	185,186	Trichloroethylene
4	Stelco Inc., Stelco Hamilton	Hamilton, ON	29	33	6	180,680	Benzene
5	Domfoam International Inc., Domfoam, Valle Foam Industries (1995) Inc	St Leonard, QC	16	30	2	178,427	Dichloromethane
6	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	29	33	3	165,550	Nickel/Lead and compounds
7	Inco Limited, Thompson Operations	Thompson, MB	29	33	3	164,280	Nickel and compounds
8	MAAX Canada Inc. Westco Div., MAAX Inc.	Armstrong, BC	16	30	1	163,680	Styrene
9	Camoplast Inc, Division Roski I	Roxton Falls, QC	16	30	1	142,300	Styrene
10	Ainsworth Lumber Co. Ltd., Grande Prairie OSB Mill	Grande Prairie, AB	25	24	2	132,050	Formaldehyde
	Subtotal				**24**	**1,777,034**	
	% of Total				**1**	**19**	
	Total for NPRI Known or Suspected Carcinogens in matched database				**1,798**	**9,282,690**	

Note: The data are estimates of releases of chemicals as reported by facilities and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.
A chemical (and its compounds) is included if the chemical or any of its compounds is listed by the International Agency for Research on Cancer (IARC: Group 1, 2A or 2B) or the US National Toxicology Program (NTP).

Table 9–5. The 10 NPRI Facilities with the Largest Surface Water Discharges of Known or Suspected Carcinogens, 2002

Rank	Facility	City, Province	SIC Codes Canada	SIC Codes US	Number of Forms	On-site Surface Water Discharges (kg)	Major Chemicals Reported (chemicals accounting for more than 70% of total reported amounts from the facility)
1	Irving Pulp & Paper Limited / Irving Tissue Company, J.D. Irving Limited	Saint John, NB	27	26	3	23,403	Formaldehyde, Acetaldehyde
2	Inco Limited, Thompson Operations	Thompson, MB	29	33	3	21,500	Nickel and compounds
3	La Compagnie Abitibi Consolidated du Canada, Division Port-Alfred	La Baie, QC	27	26	1	10,150	Formaldehyde, Acetaldehyde
4	Canfor - Prince George Pulp and Paper Mills, Canadian Forest Products Ltd.	Prince George, BC	27	26	3	5,615	Formaldehyde, Acetaldehyde
5	Weyerhaeuser Company Limited, Kamloops Pulp Division	Kamloops, BC	27	26	3	4,983	Formaldehyde, Acetaldehyde
6	Weyerhaeuser Saskatchewan Limited, Prince Albert Pulp & Paper	Prince Albert, SK	27	26	3	3,320	Formaldehyde, Acetaldehyde
7	Canadian Forest Products Ltd., Northwood Pulp Mill	Prince George, BC	27	26	3	3,152	Formaldehyde, Acetaldehyde
8	Tembec Inc, Site de Témiscaming	Témiscaming, QC	27	26	3	2,844	Formaldehyde
9	AV Cell Inc., Tembec/Grasim Industries/Thai Rayon/P.T. Indo Barat	Atholville, NB	27	26	3	2,361	Acetaldehyde
10	Nexfor Fraser Papers Inc., Edmundston Operations	Edmundston, NB	27	26	1	2,080	Acetaldehyde
	Subtotal				**26**	**79,409**	
	% of Total				**1**	**70**	
	Total for NPRI Known or Suspected Carcinogens in matched database				**1,798**	**112,899**	

Note: The data are estimates of releases of chemicals as reported by facilities and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.
A chemical (and its compounds) is included if the chemical or any of its compounds is listed by the International Agency for Research on Cancer (IARC: Group 1, 2A or 2B) or the US National Toxicology Program (NTP).

Table 9–6. The 10 TRI Facilities with the Largest Air Releases of Known or Suspected Carcinogens, 2002

Rank	Facility	City, State	US SIC Code	Number of Forms	On-site Air Releases (kg)	Major Chemicals Reported (chemicals accounting for more than 70% of total reported amounts from the facility)
1	Aqua Glass Main Plant, Masco Corp.	Adamsville, TN	30	1	754,031	Styrene
2	3V Inc.	Georgetown, SC	28	5	556,113	Dichloromethane
3	Daramic Inc., Intertech Group Inc.	Corydon, IN	30	1	498,327	Trichloroethylene
4	Eastman Kodak Co. Kodak Park	Rochester, NY	38	8	430,814	Dichloromethane
5	Foamex L.P.	Corry, PA	30	2	328,252	Dichloromethane
6	Aqua Glass Performance Plant, Masco Corp.	Mc Ewen, TN	30	1	316,058	Styrene
7	Abbott Health Prods. Inc., Abbott Labs	Barceloneta, PR	28	1	296,503	Dichloromethane
8	Lasco Bathware Inc., Tomkins Corp.	Cordele, GA	30	1	290,249	Styrene
9	Lasco Bathware Inc., Tomkins Corp.	Three Rivers, MI	30	1	283,746	Styrene
10	Weyerhaeuser Co.	Longview, WA	26 and 24	8	281,353	Acetaldehyde
	Subtotal			**29**	**4,035,447**	
	% of Total			**0.1**	**8**	
	Total for TRI Known or Suspected Carcinogens in matched database			**21,729**	**53,013,843**	

Note: The data are estimates of releases of chemicals as reported by facilities and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.
A chemical (and its compounds) is included if the chemical or any of its compounds is listed by the International Agency for Research on Cancer (IARC: Group 1, 2A or 2B) or the US National Toxicology Program (NTP).

Table 9–7. The 10 TRI Facilities with the Largest Surface Water Discharges of Known or Suspected Carcinogens, 2002

Rank	Facility	City, State	US SIC Code	Number of Forms	On-site Surface Water Discharges (kg)	Major Chemicals Reported (chemicals accounting for more than 70% of total reported amounts from the facility)
1	Potlatch Corp. Idaho Pulp & Paperboard	Lewiston, ID	26 and 24	4	20,141	Acetaldehyde, Formaldehyde
2	Albemarle Corp.	Orangeburg, SC	28	2	16,559	Formaldehyde
3	Eastman Chemical Co. Tennessee Ops.	Kingsport, TN	28	13	14,543	1,4-Dioxane, Cobalt and compounds
4	Dunkirk Steam Station, NRG Energy Inc.	Dunkirk, NY	49	2	12,381	Nickel and compounds
5	Electrolux Home Prods.	Webster City, IA	36	2	12,245	Nickel and compounds
6	Union Carbide Corp.Taft/Star Mfg. Plant, Dow Chemical Co.	Hahnville, LA	28	13	10,283	1,4-Dioxane, Formaldehyde
7	Georgia-Pacific Corp. Paper Mill	Palatka, FL	26	5	10,185	Formaldehyde
8	Huntley Generating Station, NRG Energy Inc.	Tonawanda, NY	49	2	10,068	Nickel and compounds
9	Solutia Port Plastics	Addyston, OH	28	1	9,070	Formaldehyde
10	Farmer Bros Co.	Torrance, CA	20	1	8,963	Propylene oxide
	Subtotal			**45**	**124,438**	
	% of Total			**0.2**	**22**	
	Total for TRI Known or Suspected Carcinogens in matched database			**21,729**	**578,282**	

Note: The data are estimates of releases of chemicals as reported by facilities and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.
A chemical (and its compounds) is included if the chemical or any of its compounds is listed by the International Agency for Research on Cancer (IARC: Group 1, 2A or 2B) or the US National Toxicology Program (NTP).

NTP as “may reasonably be anticipated to be carcinogenic.”

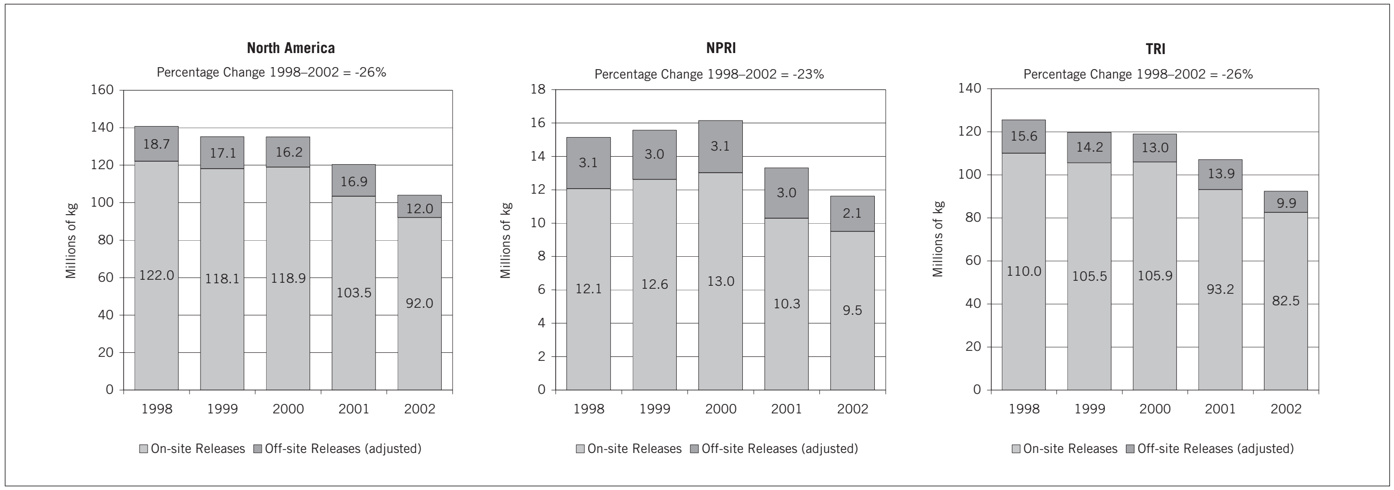
- Among the 10 TRI facilities with the largest air releases of known or suspected carcinogens, there were six rubber and plastics manufacturers and two chemical manufacturers. The 10 facilities accounted for 8 percent of total TRI air releases of carcinogens in 2002.
- The Masco Corporation’s Aqua Glass facility in Adamsville, Tennessee, reported the largest on-site air releases of carcinogens in TRI, with over 754,000 kg in 2002. Styrene was the primary carcinogen released to the air by this rubber and plastics products manufacturer. Styrene is classified as possibly carcinogenic to humans under IARC (Group 2B).
- The chemical manufacturer 3V Inc. in Georgetown, South Carolina, reported the second-largest air releases of carcinogens in TRI, with over 556,000 kg. Dichloromethane was the primary carcinogen released to the air by this facility. Dichloromethane is classified as possibly carcinogenic to humans under IARC (Group 2B) and as may reasonably be anticipated to be carcinogenic under NTP.
- Among the 10 TRI facilities with the largest surface water discharges of known or suspected carcinogens, four were chemical manufacturers. These 10 facilities accounted for 22 percent of all surface water discharges of carcinogens reported to TRI for 2002.
- The Potlatch Corp. Idaho Pulp and Paperboard facility in Lewiston, Idaho, reported the largest surface water discharges of carcinogens in TRI, with over 20,000 kg. Acetaldehyde and formaldehyde were the carcinogens released to surface waters in the largest amounts from this facility. Under IARC, acetaldehyde is classified as possibly carcinogenic to humans (Group 2B) and formaldehyde is classified as probably carcinogenic to humans under IARC (Group 2A). Under NTP, both of these chemicals are classified as may reasonably be anticipated to be carcinogenic.
- The chemical manufacturer Albemarle Corp. in Orangeburg, South Carolina, reported the second-largest surface water discharges of carcinogens in TRI, with over 16,500 kg, mainly of formaldehyde.

9.2.3 Releases On- and Off-site of Carcinogens, 1998–2002

Fifty known or suspected carcinogens were reported from 1998 to 2002. This excludes five chemicals, which were added to NPRI reporting for the 1999 reporting year (chlorendic acid, 3-chloro-2-methyl-1-propene, 3,3'-dichlorobenzidine dihydrochloride, polychlorinated alkanes (C10 to C13), and potassium bromate). Also, lead and its compounds are not included because the threshold for reporting these substances has been lowered since 1998. Note that arsenic and cadmium and their compounds are no longer in the matched data set and, therefore, not included here because their thresholds for reporting were lowered by NPRI and not TRI.

- Total releases on- and off-site of known or suspected carcinogens decreased by 26 percent from 1998 to 2002, compared to a decrease of 11 percent for all matched chemicals.
- Total releases of carcinogens reported by NPRI facilities decreased by 23 percent and those by TRI facilities decreased by 26 percent.
- Dichloromethane had the largest reported reduction in total releases on- and off-site from 1998 to 2002 of the carcinogens. The reduction for dichloromethane was 70 percent, or 14.8 million kg. Two facilities owned by the Carpenter Co. (one located in Russelville, Kentucky, and another in Verona, Mississippi) accounted for releases of more than 7.0 million kg each in 1998 and did not report dichloromethane in 2002. Dichloromethane is classified as a possible carcinogen to humans under IARC (Group 2B) and may reasonably be anticipated to be carcinogenic under NTP.
- Acrylonitrile led the increases, with an increase of 2.9 million kg, over 100 percent. One facility, the chemical manufacturer Solutia – Chocolate Bayou in Alvin, Texas, reported an increase of 3.0 million kg in on-site underground injection of acrylonitrile from 1998

Figure 9–2. Change in Total Releases On- and Off-site of Known or Suspected Carcinogens in North America, 1998–2002



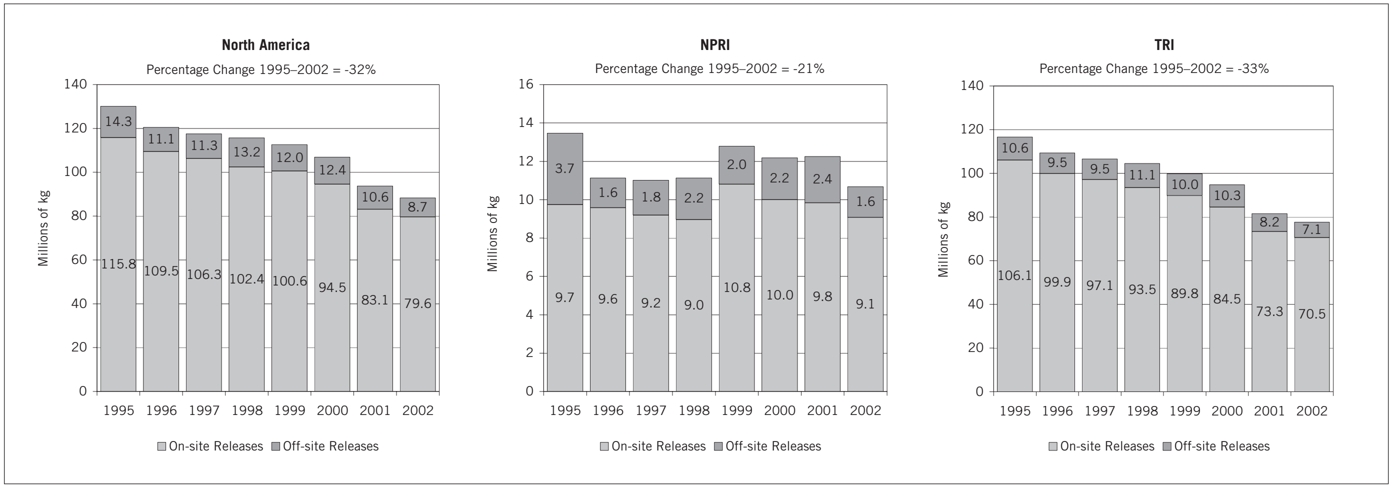
Note: Canada and US data only. Mexico data not available for 1998–2002. A chemical (and its compounds) is included if the chemical or any of its compounds is listed by the International Agency for Research on Cancer (IARC: Group 1, 2A or 2B) or the US National Toxicology Program (NTP). Does not include lead and its compounds.

Table 9–8. Chemicals with Largest Change in Total Releases On- and Off-site of Known or Suspected Carcinogens in North America, 1998–2002

Rank	CAS Number		Chemical	Total Releases On- and Off-site (adjusted)* 1998 (kg)	1999 (kg)	2000 (kg)	2001 (kg)	2002 (kg)	Change 1998–2002 kg	%
Decreases										
1	75-09-2	p,t	Dichloromethane	21,090,593	18,783,093	16,458,477	11,768,870	6,255,741	-14,834,851	-70
2	1332-21-4	p,t	Asbestos (friable)	15,138,587	11,351,217	15,329,572	11,267,640	4,138,309	-11,000,279	-73
3	100-42-5		Styrene	27,440,043	30,399,477	28,096,607	24,360,260	24,531,087	-2,908,956	-11
4	79-01-6	p,t	Trichloroethylene	6,886,341	5,609,617	5,175,491	4,664,501	4,459,625	-2,426,716	-35
5	67-66-3	p	Chloroform	3,182,945	2,631,560	1,718,846	770,250	774,971	-2,407,975	-76
Increases										
1	107-13-1	p,t	Acrylonitrile	2,348,377	2,595,067	2,433,381	5,214,133	5,264,586	2,916,209	124
2	79-06-1	p	Acrylamide	2,887,781	3,423,753	3,929,955	3,430,826	3,925,884	1,038,103	36
3	75-07-0	p,t	Acetaldehyde	6,333,786	6,800,839	7,142,300	6,879,709	7,239,457	905,671	14
4	123-91-1	p	1,4-Dioxane	343,139	479,032	294,258	426,552	520,809	177,671	52
5	56-23-5	p,t	Carbon tetrachloride	147,791	128,218	159,068	187,848	284,420	136,629	92

Note: Canada and US data only. Mexico data not available for 1998–2002. A chemical (and its compounds) is included if the chemical or any of its compounds is listed by the International Agency for Research on Cancer (IARC: Group 1, 2A or 2B) or the US National Toxicology Program (NTP). Does not include lead and its compounds.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.
* Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

Figure 9–3. Change in Total Releases On- and Off-site of Known or Suspected Carcinogens in North America, 1995–2002



Note: Canada and US data only. Mexico data not available for 1995–2002. A chemical (and its compounds) is included if the chemical or any of its compounds is listed by the International Agency for Research on Cancer (IARC: Group 1, 2A or 2B) or the US National Toxicology Program (NTP). Does not include lead and its compounds.

Table 9–9. Chemicals with Largest Change in Total Releases On- and Off-site of Known or Suspected Carcinogens in North America, 1995–2002

				Total Releases On- and Off-site									
Rank	CAS Number		Chemical	1995 (kg)	1996 (kg)	1997 (kg)	1998 (kg)	1999 (kg)	2000 (kg)	2001 (kg)	2002 (kg)	Change 1995–2002 kg	Change 1995–2002 %
Decreases													
1	75-09-2	p,t	Dichloromethane	28,559,898	26,809,611	24,279,705	20,760,378	18,442,995	16,262,246	11,526,922	6,164,167	-22,395,731	-78
2	79-01-6	p,t	Trichloroethylene	12,621,975	10,784,980	9,067,334	6,859,297	5,569,051	5,116,987	4,590,506	4,365,144	-8,256,831	-65
3	67-66-3	p	Chloroform	5,120,411	4,697,084	3,639,157	3,182,365	2,574,678	1,634,551	717,136	705,934	-4,414,477	-86
4	1332-21-4	p,t	Asbestos (friable)	5,739,844	3,140,624	2,977,112	5,635,532	3,435,480	2,850,257	2,549,282	1,450,851	-4,288,993	-75
5	127-18-4	p,t	Tetrachloroethylene	4,547,089	3,705,117	3,329,110	2,537,847	1,801,091	1,549,451	1,271,933	1,088,143	-3,458,946	-76
Increases													
1	100-42-5		Styrene	21,258,626	21,434,134	22,832,425	27,341,541	30,304,964	28,050,747	24,315,318	24,396,513	3,137,887	15
2	107-13-1	p,t	Acrylonitrile	3,074,265	2,236,534	2,345,124	2,347,389	2,577,911	2,422,346	5,187,988	5,264,330	2,190,065	71
3	--	m,p,t	Nickel (and its compounds)	7,613,747	7,808,136	8,849,812	8,563,813	7,593,251	9,303,979	7,697,583	9,223,237	1,609,490	21
4	79-06-1	p	Acrylamide	2,859,445	2,687,843	3,294,204	2,887,644	3,418,037	3,929,948	3,423,909	3,925,878	1,066,433	37
5	50-00-0	p	Formaldehyde	10,064,020	11,233,696	11,576,344	11,552,350	12,691,158	13,061,146	11,492,639	10,482,847	418,826	4

Note: Canada and US data only. Mexico data not available for 1995–2002. A chemical (and its compounds) is included if the chemical or any of its compounds is listed by the International Agency for Research on Cancer (IARC: Group 1, 2A or 2B) or the US National Toxicology Program (NTP). Does not include lead and its compounds.
m = Metal and its compounds.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.

to 2002. Acrylonitrile is classified as a possible carcinogen to humans under IARC (Group 2B) and may reasonably be anticipated to be carcinogenic under NTP.

9.2.4 Releases On- and Off-site of Carcinogens, 1995–2002

This section reports on the same 50 known or suspected carcinogens as in the previous section but only includes the manufacturing facilities. Electric utilities, coal mining, hazardous waste and solvent recovery facilities are not included because they were not required to report to TRI before 1998.

- Total releases on- and off-site of known or suspected carcinogens decreased by 32 percent from 1995 to 2002, compared to a decrease of 12 percent for all matched chemicals.
- Total releases of carcinogens reported by NPRI facilities decreased by 21 percent and those reported by TRI facilities decreased by 33 percent. Reductions for both NPRI and TRI occurred primarily in the more recent years of the time period, from 1999 to 2002.
- Dichloromethane had the largest reported reduction in total releases on- and off-site from 1995 to 2002 of the carcinogens, with a 78-percent reduction, or 22.4 million kg. Dichloromethane is classified as a possible carcinogen to humans under IARC (Group 2B) and may reasonably be anticipated to be carcinogenic under NTP.
- Styrene led the increases with 3.1 million kg, or 15 percent. Styrene is classified as possibly carcinogenic to humans under IARC (Group 2B). Acrylonitrile also showed an increase of over 2 million kg, an increase of 71percent. Acrylonitrile is classified as a possible carcinogen to humans under IARC (Group 2B) and may reasonably be anticipated to be carcinogenic under NTP.

9.3 Chemicals Linked to Cancer, Birth Defects and Other Reproductive Harm (California Proposition 65 Chemicals)

As noted in **Chapter 2**, California's Safe Drinking Water and Toxic Enforcement Act of 1986 (enacted after voters' approval of Proposition 65) requires the publication of a list of chemicals that are known to the state of California to cause cancer, birth defects or other reproductive harm (found online at <http://www.oehha.ca.gov/prop65/prop65_list/files/070904list.html>). As of July 2004, the list contained almost 700 substances, of which 77 are in the matched data set. Only two, C.I. Solvent Yellow 14 and Michler's ketone, had no reports in 2002.

A chemical (and its compounds) is included in this analysis if the chemical or any of its compounds is on the Proposition 65 list because they are reported as one category in the PRTRs. The one exception is chromium and its compounds, which are not included because they are no longer reported as a single category under NPRI. NPRI reports on hexavalent chromium (the chromium compound which is carcinogenic) separately from other chromium compounds. Under TRI, all chromium compounds are reported as a single amount. For NPRI, total releases for hexavalent chromium were 321,403 kg and for chromium and its other compounds total releases were 2.7 million kg. For TRI, total releases of chromium and its compounds were 27.3 million kg. These amounts are not included in this section.

9.3.1 Releases and Transfers of Chemicals Linked to Cancer, Birth Defects and Other Reproductive Harm (California Proposition 65 Chemicals), 2002

- In 2002, facilities released 179.4 million kg of chemicals that are linked to cancer, birth defects and reproductive harm (Proposition 65 chemicals). This was 12 percent of all North American releases in 2002.

Table 9–10. On- and Off-site Releases of California Proposition 65 Chemicals, 2002

				On-site Releases					
CAS Number		Chemical	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases kg	Rank
--		Lead (and its compounds)	8,783	960,623	67,179	139,038	23,644,857	24,811,698	2
108-88-3		Toluene	3,529	34,832,661	12,059	397,298	53,721	35,304,173	1
--	m,c,t	Nickel (and its compounds)	3,809	993,502	124,136	241,223	10,426,005	11,787,505	4
75-15-0		Carbon disulfide	131	13,543,277	4,212	2,296	1,137	13,550,922	3
50-00-0	c	Formaldehyde	938	6,403,186	194,838	3,584,498	57,231	10,242,135	5
75-07-0	c,t	Acetaldehyde	363	6,715,876	189,359	325,776	6,886	7,237,897	6
75-09-2	c,t	Dichloromethane	578	6,029,692	2,171	138,203	2,006	6,173,486	7
107-13-1	c,t	Acrylonitrile	117	314,133	418	4,941,021	184	5,255,814	8
79-01-6	c,t	Trichloroethylene	525	4,316,998	262	63,578	104	4,382,912	9
100-41-4	c	Ethylbenzene	1,775	3,678,931	4,750	431,231	4,719	4,126,827	10
1332-21-4	c,t	Asbestos (friable)	103	288	0	0	2,538,772	2,539,060	13
79-06-1	c	Acrylamide	86	5,712	75	3,917,201	0	3,923,121	11
71-43-2	c,t	Benzene	1,079	3,378,520	9,619	374,089	21,142	3,785,976	12
872-50-4		N-Methyl-2-pyrrolidone	502	1,329,732	5,736	1,111,682	16,574	2,463,827	14
--	m,c	Cobalt (and its compounds)	772	65,952	20,999	20,034	1,999,561	2,107,477	15
91-20-3		Naphthalene	828	1,284,670	12,831	75,835	294,688	1,670,386	16
74-87-3		Chloromethane	96	1,499,430	783	60,463	24	1,560,893	17
127-18-4	c,t	Tetrachloroethylene	381	1,078,273	397	67,609	65,543	1,212,411	18
106-99-0	c,t	1,3-Butadiene	224	952,951	945	17,395	400	971,929	19
67-66-3	c	Chloroform	119	640,277	8,618	84,859	28,309	762,174	20
117-81-7	c,t	Di(2-ethylhexyl) phthalate	364	292,662	614	0	12,140	305,588	26
110-86-1		Pyridine	60	35,839	209	504,859	703	541,609	21
123-91-1	c	1,4-Dioxane	54	48,629	34,068	0	863	83,560	34
75-00-3		Chloroethane	55	360,891	253	1,551	16	362,711	24
62-53-3		Aniline	78	76,671	1,722	314,473	4,614	397,481	22
75-01-4	c,t	Vinyl chloride	64	316,300	263	63,248	2	379,823	23
107-06-2	c,t	1,2-Dichloroethane	92	213,423	2,011	96,514	277	312,226	25
56-23-5	c,t	Carbon tetrachloride	61	201,896	145	78,117	21	280,603	27
--		Mercury (and its compounds)	1,808	65,901	608	9,163	82,020	157,693	32
74-83-9	t	Bromomethane	39	233,491	51	1,807	2	235,404	28
109-86-4		2-Methoxyethanol	38	199,777	14,772	0	0	214,562	29
75-21-8	c,t	Ethylene oxide	162	196,313	1,988	0	446	198,823	30
75-56-9	c	Propylene oxide	114	132,553	8,975	1,134	35,698	178,362	31
98-95-3	c	Nitrobenzene	27	30,838	24	107,510	42	138,414	33
554-13-2		Lithium carbonate	49	6,249	5,609	0	10,884	22,862	44
140-88-5	c	Ethyl acrylate	109	56,611	29	0	11	56,759	37
106-89-8	c	Epichlorohydrin	73	75,618	6,268	0	1,246	83,134	35
78-87-5		1,2-Dichloropropane	14	65,625	557	0	1,338	67,520	36
106-46-7	c	1,4-Dichlorobenzene	27	49,068	153	3,987	4	53,314	38
26471-62-5	c	Toluenediisocyanate (mixed isomers)	196	17,169	258	0	8,534	26,261	43
74-88-4		Methyl iodide	14	35,882	13	0	229	36,124	39
101-77-9	c	4,4'-Methylenedianiline	22	5,649	50	25,850	0	31,550	41
302-01-2	c	Hydrazine	58	1,024	2,163	29,932	29	33,150	40
110-80-5		2-Ethoxyethanol	27	26,168	399	0	0	26,566	42
120-80-9	c	Catechol	127	4,861	7,677	0	594	13,132	47
79-00-5		1,1,2-Trichloroethane	28	18,314	570	0	7	19,528	45
91-22-5		Quinoline	20	2,715	8	10,912	2	13,637	46
139-13-9	c	Nitrilotriacetic acid	18	1,607	0	399	6,419	8,426	50
62-56-6	c	Thiourea	24	766	164	9,977	113	11,021	48
79-46-9	c	2-Nitropropane	7	8,824	117	0	0	8,941	49
64-67-5	c	Diethyl sulfate	31	7,947	0	0	0	7,947	51
924-42-5		N-Methylolacrylamide	35	3,837	529	0	15	4,381	53
100-44-7	c	Benzyl chloride	43	4,115	77	0	152	4,382	52
25321-14-6		Dinitrotoluene (mixed isomers)	12	3,648	28	499	0	4,174	55
79-34-5		1,1,2,2-Tetrachloroethane	19	3,634	664	0	0	4,299	54
77-78-1	c	Dimethyl sulfate	30	3,715	0	0	0	3,715	56
96-45-7	c	Ethylene thiourea	14	53	2	0	0	55	64
563-47-3		3-Chloro-2-methyl-1-propene	3	3,530	0	0	0	3,530	57
90-43-7		2-Phenylphenol	18	3	0	0	0	6	68
64-75-5		Tetracycline hydrochloride	6	5	0	0	0	5	69
28407-37-6		C.I. Direct Blue 218	5	0	0	0	340	340	60
121-14-2	c	2,4-Dinitrotoluene	10	93	3	0	0	196	61
101-14-4	c	4,4'-Methylenebis(2-chloroaniline)	21	3	0	0	0	8	67
67-72-1	c	Hexachloroethane	21	411	3	139	0	552	59
95-80-7	c	2,4-Diaminotoluene	8	569	2	0	0	572	58
606-20-2	c	2,6-Dinitrotoluene	4	53	0	0	0	54	65
94-59-7	c	Safrole	3	113	0	0	0	113	62
115-28-6		Chlorendic acid	2	2	0	0	0	2	71
120-58-1		Isosafrole	2	0	0	0	0	0	--
7758-01-2		Potassium bromate	1	113	0	0	0	113	63
86-30-6		N-Nitrosodiphenylamine	5	9	0	0	0	9	66
612-83-9		3,3'-Dichlorobenzidine dihydrochloride	13	3	0	0	0	3	70
96-09-3	c	Styrene oxide	1	2	0	0	0	2	72
81-88-9		C.I. Food Red 15	3	0	0	0	0	0	--
1314-20-1		Thorium dioxide	1	0	0	0	0	0	--
		Subtotal	**28,878**	**90,837,877**	**750,436**	**17,253,400**	**39,328,625**	**148,203,864**	
		% of Total	**34**	**12**	**1**	**21**	**12**	**12**	
		Total	**84,654**	**752,310,204**	**106,556,614**	**80,719,282**	**334,153,615**	**1,273,863,312**	

Note: Canada and US data only. Mexico data not available for 2002. A chemical (and its compounds) is included if the chemical or any of its compounds is on the California Proposition 65 List.
c = Known or suspected carcinogens.
m = Metal and its compounds.
t = CEPA Toxic chemical.

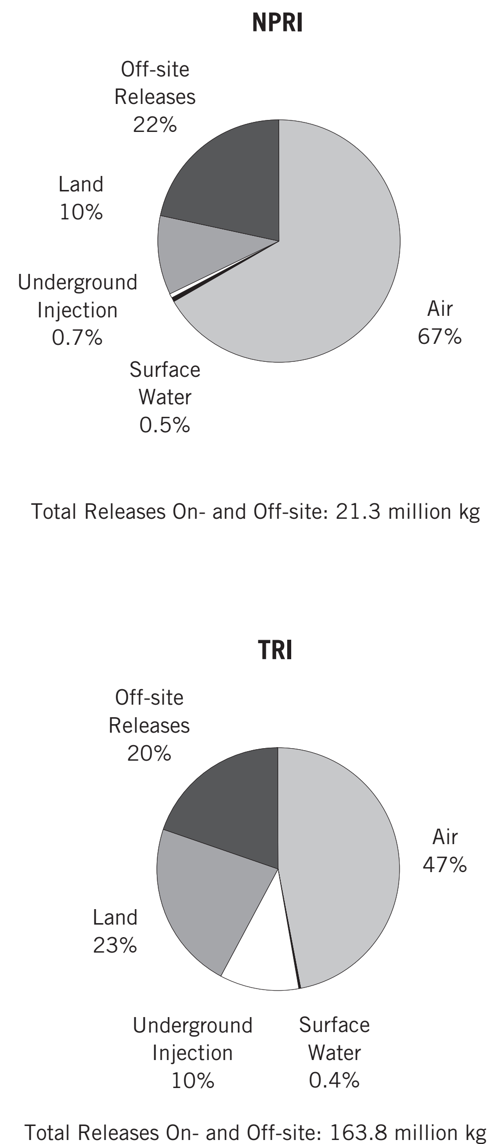
Table 9–10. (*continued*)

Off-site Releases				Total Releases				
Disposal (except metals) (kg)	Disposal of Metals (kg)	Total Off-site Releases kg	Rank	Total Reported Releases On- and Off-site kg	Rank	Adjustment Component* (kg)	Total Releases (adjusted)** kg	Rank
0	23,542,903	23,542,903	1	48,354,601	1	5,038,351	43,316,249	1
804,477	0	804,477	4	36,108,650	2	26,228	36,082,422	2
0	7,745,644	7,745,644	2	19,533,149	3	464,084	19,069,065	3
1,205	0	1,205	44	13,552,127	4	0	13,552,127	4
284,563	0	284,563	9	10,526,698	5	3,631	10,523,068	5
1,560	0	1,560	39	7,239,457	6	0	7,239,457	6
84,024	0	84,024	15	6,257,510	7	1,769	6,255,741	7
8,772	0	8,772	25	5,264,586	8	0	5,264,586	8
77,446	0	77,446	16	4,460,358	9	464	4,459,894	9
71,759	0	71,759	17	4,198,586	10	18,094	4,180,492	10
1,617,246	0	1,617,246	3	4,156,306	11	17,997	4,138,309	11
2,763	0	2,763	35	3,925,884	12	0	3,925,884	12
96,746	0	96,746	13	3,882,722	13	24,711	3,858,012	13
376,096	0	376,096	8	2,839,923	14	267	2,839,656	14
0	551,196	551,196	5	2,658,673	15	10,560	2,648,113	15
157,565	0	157,565	11	1,827,951	16	20,716	1,807,235	16
176	0	176	57	1,561,070	17	0	1,561,070	17
174,237	0	174,237	10	1,386,647	18	1,243	1,385,405	18
1,235	0	1,235	43	973,164	19	0	973,164	19
13,612	0	13,612	23	775,785	20	68	775,718	20
386,755	0	386,755	7	692,343	21	0	692,343	21
5,115	0	5,115	29	546,724	22	5	546,719	22
437,250	0	437,250	6	520,809	23	0	520,809	23
42,474	0	42,474	19	405,185	24	0	405,185	24
7,453	0	7,453	26	404,934	25	696	404,238	25
167	0	167	58	379,991	26	0	379,991	26
13,849	0	13,849	21	326,076	27	9	326,067	27
3,852	0	3,852	31	284,455	28	35	284,420	28
0	91,361	91,361	14	249,053	29	5,430	243,623	29
127	0	127	61	235,531	30	0	235,531	30
9,034	0	9,034	24	223,596	31	0	223,596	31
3,380	0	3,380	33	202,203	32	0	202,203	32
6,262	0	6,262	28	184,624	33	0	184,624	33
6,727	0	6,727	27	145,141	34	1,527	143,614	34
118,551	0	118,551	12	141,414	35	0	141,414	35
60,269	0	60,269	18	117,028	36	9,700	107,328	36
1,560	0	1,560	40	84,694	37	0	84,694	37
128	0	128	60	67,649	38	0	67,649	38
605	0	605	49	53,920	39	0	53,920	39
14,580	0	14,580	20	40,840	40	2,359	38,482	40
263	0	263	53	36,388	41	0	36,388	41
2,712	0	2,712	36	34,262	42	0	34,262	42
86	0	86	65	33,236	43	0	33,236	43
278	0	278	52	26,845	44	0	26,845	44
13,635	0	13,635	22	26,766	45	0	26,766	45
259	0	259	54	19,786	46	0	19,786	46
625	0	625	48	14,262	47	0	14,262	47
5,022	0	5,022	30	13,447	48	0	13,447	48
36	0	36	67	11,056	49	0	11,056	49
239	0	239	55	9,180	50	0	9,180	50
0	0	0	--	7,947	51	0	7,947	51
2,648	0	2,648	37	7,028	52	0	7,028	52
1,457	0	1,457	41	5,839	53	0	5,839	53
696	0	696	47	4,870	54	0	4,870	54
162	0	162	59	4,461	55	0	4,461	55
119	0	119	62	3,834	56	0	3,834	56
3,592	0	3,592	32	3,647	57	0	3,647	57
0	0	0	--	3,530	58	0	3,530	58
2,829	0	2,829	34	2,834	59	0	2,834	59
1,905	0	1,905	38	1,909	60	0	1,909	60
1,383	0	1,383	42	1,723	61	0	1,723	61
1,080	0	1,080	46	1,276	62	0	1,276	62
1,092	0	1,092	45	1,100	63	0	1,100	63
342	0	342	51	895	64	0	895	64
38	0	38	66	610	65	0	610	65
388	0	388	50	441	66	0	441	66
116	0	116	63	229	67	0	229	67
190	0	190	56	193	68	0	193	68
116	0	116	64	116	69	0	116	69
0	0	0	--	113	70	0	113	70
0	0	0	--	9	71	0	9	71
1	0	1	68	4	72	0	4	72
0	0	0	--	2	73	0	2	73
0	0	0	--	0	--	0	0	--
0	0	0	--	0	--	0	0	--
4,932,930	**31,931,104**	**36,864,033**		**185,067,898**		**5,647,941**	**179,419,957**	
20	**13**	**14**		**12**		**14**	**12**	
24,716,457	**244,704,667**	**269,421,125**		**1,543,284,437**		**41,028,398**	**1,502,256,039**	

* Off-site releases also reported as on-site releases by another NPRI or TRI facility. This amount is subtracted from total reported releases on- and off-site to get total releases (adjusted).

** Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

Figure 9–4. Releases On- and Off-site of California Proposition 65 Chemicals, NPRI and TRI, 2002



- Lead and its compounds, with lead listed as a developmental toxicant and lead and lead compounds listed as a carcinogen on the Proposition 65 list, was released in the largest amounts, 43.3 million kg, representing 24 percent of all releases of these substances in 2002. Most releases of lead and its compounds were as on-site land disposal or off-site transfers to disposal.
- Toluene, a developmental toxicant, was released in the second-largest amount, with 36.1 million kg, including 34.8 million kg of on-site air releases.
- NPRI facilities reported 21.3 million kg (11 percent of the total reported releases in North America) and TRI facilities reported 163.8 million kg of Proposition 65 chemicals released on- and off-site (89 percent of the total reported releases).

9.3.2 Facilities with the Largest Total Reported Releases On- and Off-site of Chemicals Linked to Cancer, Birth Defects and Other Reproductive Harm (California Proposition 65 Chemicals), 2002

Facilities with Largest Total Releases, 2002

- The 10 NPRI facilities with the largest total reported releases of chemicals known to cause cancer, birth defects or reproductive harm (Proposition 65 chemicals) in the matched data set accounted for 23 percent of the 21.3 million kg total reported by all NPRI facilities.
- The NPRI facility with the largest total reported releases was the hazardous waste management Clean Harbors Canada Lambton facility in Corunna, Ontario, with 1.3 million kg, mainly as on-site land disposal of lead and its compounds. Lead is listed as a developmental toxicant and lead and lead compounds are listed as carcinogens on the Proposition 65 list
- The chemical manufacturer Bayer Inc. in Sarnia, Ontario, reported the second-largest releases. This facility reported over 768,000 kg of Proposition 65 chemicals, mainly of chloromethane air emissions. Chloromethane is listed as a developmental toxin on the Proposition 65 list.
- The 10 TRI facilities with the largest total reported releases of Proposition 65 chemicals in the matched data set accounted for 20 percent of the 163.8 million kg total reported by all TRI facilities.
- The TRI facility with the largest total releases was the chemical manufacturer Lenzing Fibres Corp. in Lowland, Tennessee, reporting 8.0 million kg of on-site air releases of carbon disulfide. Carbon disulfide is listed as a developmental and reproductive toxin on the Proposition 65 list.

Table 9–11. The 10 NPRI Facilities with the Largest Total Releases of California Proposition 65 Chemicals, 2002

			SIC Codes			On-site Releases				
Rank	Facility	City, Province	Canada	US	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Clean Harbors Canada Inc., Lambton Facility	Corunna, ON	49	495/738	6	114	0	0	1,335,588	1,335,702
2	Bayer Inc. Sarnia Site, Bayer AG	Sarnia, ON	37	28	7	751,463	1	0	1,260	752,724
3	Noranda Inc, Brunswick Smelter	Belledune, NB	29	33	2	8,618	107	0	0	8,725
4	General Motors of Canada Limited, Oshawa Car Assembly Plant	Oshawa, ON	32	37	3	437,673	0	0	0	437,673
5	Canadian Technical Tape, Montreal Plant	St-laurent, QC	27	26	1	435,259	0	0	0	435,259
6	IPSCO Saskatchewan Inc., Regina Plant Site, IPSCO Inc.	Regina, SK	29	33	3	3,199	0	0	0	3,239
7	Stelco Inc., Stelco Hamilton	Hamilton, ON	29	33	8	197,367	443	0	5	198,305
8	3M Canada Company (Perth)	Perth, ON	35	32	2	312,875	0	0	0	312,875
9	Canadian General-Tower Limited	Cambridge, ON	16	30	1	262,000	0	0	0	262,000
10	Vitafoam Products Canada Ltd., Toronto	Downsview, ON	16	30	2	265,340	0	0	0	265,340
	Subtotal				**35**	**2,673,907**	**551**	**0**	**1,336,853**	**4,011,842**
	% of Total				**1**	**19**	**0.5**	**0**	**61**	**24**
	Total for NPRI Proposition 65 Chemicals in matched database				**2,372**	**14,137,753**	**114,207**	**142,842**	**2,208,289**	**16,636,616**

Note: Canada and US only. Mexico data not available for 2002. The data are estimates of releases and transfers of chemicals as reported by facilities and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.
A chemical (and its compounds) is included if the chemical or any of its compounds is on the California Proposition 65 List.

Table 9–12. The 10 TRI Facilities with the Largest Total Releases of California Proposition 65 Chemicals, 2002

					On-site Releases				
Rank	Facility	City, State	US SIC Code	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Lenzing Fibers Corp.	Lowland, TN	28	3	8,031,892	0	0	1,186	8,033,078
2	Solutia - Chocolate Bayou	Alvin, TX	28	7	34,523	150	5,115,678	2	5,150,353
3	BHP Copper N.A. San Manuel Ops.	San Manuel, AZ	33	3	5	2	45,391	3,154,210	3,199,608
4	National Plastics Color Inc.	Valley Center, KS	Mult.	1	0	0	0	0	0
5	Clean Harbors of Connecticut Inc., Clean Harbors Inc.	Bristol, CT	495/738	3	0	0	0	0	0
6	Chemical Waste Management Inc., Waste Management Inc.	Kettleman City, CA	495/738	9	177	0	0	2,501,971	2,502,148
7	Sanders Lead Co. Inc.	Troy, AL	33	1	2,803	104	0	2,404,617	2,407,524
8	Monsanto - Luling	Luling, LA	28	3	23,547	1,451	2,145,977	0	2,170,976
9	BP Chemicals Green Lake Facility, BP America Inc.	Port Lavaca, TX	28	6	6,371	0	1,956,561	0	1,962,932
10	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT	33	4	4,177	401	0	1,837,892	1,842,470
	Subtotal			**40**	**8,103,495**	**2,107**	**9,263,608**	**9,899,878**	**27,269,088**
	% of Total			**0.2**	**11**	**0.3**	**54**	**27**	**21**
	Total for TRI Proposition 65 Chemicals in matched database			**26,506**	**76,700,125**	**636,229**	**17,110,558**	**37,120,337**	**131,567,248**

Note: Canada and US only. Mexico data not available for 2002. The data are estimates of releases and transfers of chemicals as reported by facilities and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.
A chemical (and its compounds) is included if the chemical or any of its compounds is on the California Proposition 65 List.

Table 9–11. (*continued*)

Rank	Off-site releases: Transfers to Disposal (except metals) (kg)	Off-site releases: Transfers of Metals (kg)	Off-site releases: Total Off-site Releases (kg)	Total Reported Releases On-site and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
1	0	0	0	1,335,702	Lead and compounds (land)
2	15,000	431	15,431	768,155	Chloromethane (air)
3	0	470,566	470,566	479,291	Lead and compounds (transfers of metals)
4	0	0	0	437,673	Toluene (air)
5	0	0	0	435,259	Toluene (air)
6	0	330,555	330,555	333,794	Lead and compounds (transfers of metals)
7	127,142	0	127,142	325,447	Benzene (air), Asbestos (transfers to disposal)
8	0	0	0	312,875	Toluene (air)
9	19,000	0	19,000	281,000	Toluene (air)
10	0	0	0	265,340	Dichloromethane (air)
	161,142	**801,552**	**962,694**	**4,974,536**	
	10	**27**	**21**	**23**	
	1,594,620	**3,022,652**	**4,617,272**	**21,253,888**	

Table 9–12. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total Reported Releases On-site and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
1	0	0	0	8,033,078	Carbon disulfide (air)
2	282	0	282	5,150,635	Acrylonitrile (UIJ)
3	0	132	132	3,199,739	Nickel and compounds (land)
4	0	2,594,882	2,594,882	2,594,882	Lead and compounds (transfers of metals)
5	0	2,582,183	2,582,183	2,582,183	Lead and compounds (transfers of metals)
6	92	133	225	2,502,373	Lead and compounds, Asbestos (land)
7	0	19	19	2,407,543	Lead and compounds (land)
8	0	0	0	2,170,976	Formaldehyde (UIJ)
9	0	78	78	1,963,010	Acrylamide (UIJ)
10	0	701	701	1,843,171	Lead and compounds (land)
	374	**5,178,128**	**5,178,502**	**32,447,590**	
	0.01	**18**	**16**	**20**	
	3,338,310	**28,908,452**	**32,246,762**	**163,814,010**	

UIJ = underground injection.

- The Solutia – Chocolate Bayou facility in Alvin, Texas, also a chemical manufacturer, reported 5.2 million kg of mainly on-site underground injection of acrylonitrile. Acrylonitrile is linked to cancer on the Proposition 65 list.

Facilities with Largest Air and Water Releases, 2002

- The 10 NPRI facilities with the largest air releases of California Proposition 65 chemicals accounted for 23 percent of all NPRI air releases of Proposition 65 chemicals in 2002.
- The Bayer Inc. facility in Sarnia, Ontario, reported the largest on-site air releases of Proposition 65 chemicals in NPRI, with over 751,000 kg in 2002. Chloromethane was the primary Proposition 65 chemical released to the air by this chemical manufacturer. Chloromethane is listed as a developmental toxin on the Proposition 65 list.
- The transportation equipment manufacturer General Motors of Canada facility in Oshawa, Ontario, reported the second-largest air releases of Proposition 65 chemicals in NPRI, with almost 438,000 kg. Toluene was the primary Proposition 65 chemical released to the air by this facility. Toluene is listed as a developmental toxin on the Proposition 65 list.
- Among the 10 NPRI facilities with the largest surface water discharges of known or suspected Proposition 65 chemicals in 2002, nine were paper products manufacturers and one was a primary metals facility. These 10 facilities accounted for 70 percent of all NPRI surface water discharges of Proposition 65 chemicals in 2002.
- The Irving Pulp and Paper facility in Saint John, New Brunswick, reported the largest surface water discharges of Proposition 65 chemicals in NPRI, with 23,400 kg. Formaldehyde and acetaldehyde were the Proposition 65 chemicals (linked to cancer) released to surface waters in the largest amounts from this facility.
- The primary metals facility Inco Limited in Thompson, Manitoba, reported the second-largest surface water discharges of carcinogens in NPRI, with 21,500 kg, mainly of nickel and its compounds. Under Proposition 65, nickel is listed as a carcinogen, and certain nickel

Table 9–13. The 10 NPRI Facilities with the Largest Air Releases of California Proposition 65 Chemicals, 2002

Rank	Facility	City, Province	SIC Codes Canada	SIC Codes US	Number of Forms	On-site Air Releases (kg)	Major Chemicals Reported (chemicals accounting for more than 70% of total reported amounts from the facility)
1	Bayer Inc. Sarnia Site, Bayer AG	Sarnia, ON	37	28	7	751,463	Chloromethane
2	General Motors of Canada Limited, Oshawa Car Assembly Plant	Oshawa, ON	32	37	3	437,673	Toluene
3	Canadian Technical Tape, Montreal Plant	St-Laurent, QC	27	26	1	435,259	Toluene
4	3M Canada Company (Perth)	Perth, ON	35	32	2	312,875	Toluene
5	Vitafoam Products Canada Ltd., Toronto	Downsview, ON	16	30	2	265,340	Dichloromethane
6	Canadian General-Tower Limited	Cambridge, ON	16	30	1	262,000	Toluene
7	Quebecor World Inc., Quebecor World Islington	Etobicoke, ON	28	27	1	255,964	Toluene
8	Weyerhaeuser Company Limited, Miramichi OSB	Miramichi, NB	25	24	3	199,541	Formaldehyde, Acetaldehyde
9	Stelco Inc., Stelco Hamilton	Hamilton, ON	29	33	8	197,367	Benzene
10	ITW Foils - Windsor, Illinois Tool Works	Windsor, ON	37	28	1	186,700	Toluene
	Subtotal				**29**	**3,304,182**	
	% of Total				**1**	**23**	
	Total for NPRI Proposition 65 Chemicals in matched database				**2,372**	**14,137,753**	

Note: The data are estimates of releases chemicals as reported by facilities and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.
A chemical (and its compounds) is included if the chemical or any of its compounds is on the California Proposition 65 List.

Table 9–14. The 10 NPRI Facilities with the Largest Surface Water Discharges of California Proposition 65 Chemicals, 2002

Rank	Facility	City, Province	SIC Codes Canada	SIC Codes US	Number of Forms	On-site Surface Water Discharges (kg)	Major Chemicals Reported (chemicals accounting for more than 70% of total reported amounts from the facility)
1	Irving Pulp & Paper Limited / Irving Tissue Company, J.D. Irving Limited	Saint John, NB	27	26	3	23,403	Formaldehyde, Acetaldehyde
2	Inco Limited, Thompson Operations	Thompson, MB	29	33	3	21,500	Nickel and compounds
3	La Compagnie Abitibi Consolidated du Canada, Division Port-Alfred	La Baie, QC	27	26	1	10,150	Formaldehyde, Acetaldehyde
4	Canfor - Prince George Pulp and Paper Mills, Canadian Forest Products Ltd.	Prince George, BC	27	26	3	5,615	Formaldehyde, Acetaldehyde
5	Weyerhaeuser Company Limited, Kamloops Pulp Division	Kamloops, BC	27	26	3	4,983	Formaldehyde, Acetaldehyde
6	Weyerhaeuser Saskatchewan Limited, Prince Albert Pulp & Paper	Prince Albert, SK	27	26	3	3,320	Formaldehyde
7	Canadian Forest Products Ltd., Northwood Pulp Mill	Prince George, BC	27	26	4	3,152	Formaldehyde, Acetaldehyde
8	Tembec Inc, Site de Témiscaming	Témiscaming, QC	27	26	4	2,848	Formaldehyde
9	AV Cell Inc., Tembec/Grasim Industries/Thai Rayon/P.T. Indo Barat	Atholville, NB	27	26	3	2,361	Acetaldehyde, Chloroform
10	Nexfor Fraser Papers Inc., Edmundston Operations	Edmundston, NB	27	26	2	2,080	Acetaldehyde
	Subtotal				**29**	**79,412**	
	% of Total				**1.2**	**70**	
	Total for NPRI Proposition 65 Chemicals in matched database				**2,372**	**114,207**	

Note: The data are estimates of releases chemicals as reported by facilities and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.
A chemical (and its compounds) is included if the chemical or any of its compounds is on the California Proposition 65 List.

Table 9–15. The 10 TRI Facilities with the Largest Air Releases of California Proposition 65 Chemicals, 2002

Rank	Facility	City, State	US SIC Code	Number of Forms	On-site Air Releases (kg)	Major Chemicals Reported (chemicals accounting for more than 70% of total reported amounts from the facility)
1	Lenzing Fibers Corp.	Lowland, TN	28	3	8,031,892	Carbon disulfide
2	Teepak L.L.C.	Danville, IL	30	1	1,345,896	Carbon disulfide
3	Quebecor World Richmond Inc.	Richmond, VA	27	1	1,027,773	Toluene
4	Viskase Corp.	Loudon, TN	30	2	1,025,008	Carbon disulfide
5	Intertape Polymer Group Columbia Div., Cetral Prods. Co.	Columbia, SC	26	2	1,004,989	Toluene
6	Quebecor World Memphis Corp.-Dickson Facility	Dickson, TN	27	1	909,198	Toluene
7	QW Memphis Corp., Quebecor World Inc.	Memphis, TN	27	1	711,056	Toluene
8	Shurtape Techs. Inc. Hickory Tape Plant, STM Inc.	Hickory, NC	26	1	700,592	Toluene
9	Viskase Corp.	Osceola, AR	30	1	641,633	Carbon disulfide
10	Quebecor World Franklin	Franklin, KY	27	1	595,374	Toluene
	Subtotal			**14**	**15,993,410**	
	% of Total			**0.1**	**21**	
	Total for TRI Proposition 65 Chemicals in matched database			**26,506**	**76,700,125**	

Note: The data are estimates of releases chemicals as reported by facilities and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.
A chemical (and its compounds) is included if the chemical or any of its compounds is on the California Proposition 65 List.

Table 9–16. The 10 TRI Facilities with the Largest Surface Water Discharges of California Proposition 65 Chemicals, 2002

Rank	Facility	City, State	US SIC Code	Number of Forms	On-site Surface Water Discharges (kg)	Major Chemicals Reported (chemicals accounting for more than 70% of total reported amounts from the facility)
1	Potlatch Corp. Idaho Pulp & Paperboard	Lewiston, ID	26 and 24	4	20,141	Acetaldehyde, Formaldehyde
2	Albemarle Corp.	Orangeburg, SC	28	5	16,654	Formaldehyde
3	Eastman Chemical Co. Tennessee Ops.	Kingsport, TN	28	17	15,079	1,4-Dioxane, Cobalt and compounds
4	Eastman Chemical Co. Voridian Div.	Cayce-West Columbia, SC	28	7	13,946	2-Methoxyethanol
5	Dunkirk Steam Station, NRG Energy Inc.	Dunkirk, NY	49	3	12,387	Nickel and compounds
6	Electrolux Home Prods.	Webster City, IA	36	2	12,245	Nickel and compounds
7	Union Carbide Corp.Taft/Star Mfg. Plant, Dow Chemical Co.	Hahnville, LA	28	18	10,891	1,4-Dioxane, Formaldehyde
8	Georgia-Pacific Corp. Paper Mill	Palatka, FL	26	5	10,185	Formaldehyde
9	Huntley Generating Station, NRG Energy Inc.	Tonawanda, NY	49	3	10,071	Nickel and compounds
10	Galey & Lord Society Hill	Society Hill, SC	22	2	9,977	Naphthalene
	Subtotal			**66**	**131,576**	
	% of Total			**0.2**	**21**	
	Total for TRI Proposition 65 Chemicals in matched database			**26,506**	**636,229**	

Note: The data are estimates of releases chemicals as reported by facilities and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.
A chemical (and its compounds) is included if the chemical or any of its compounds is on the California Proposition 65 List.

compounds are listed as carcinogens or developmental toxins.

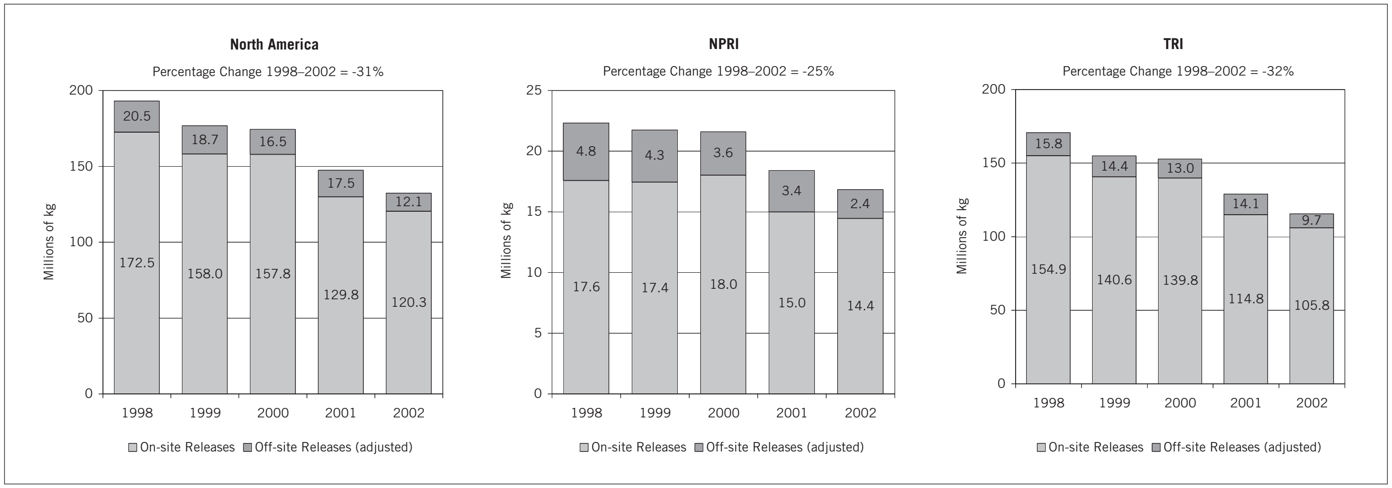
- Among the 10 TRI facilities with the largest air releases of California Proposition 65 chemicals, there were four printing and publishing facilities, three rubber and plastics products manufacturers. The one chemical manufacturer among the top ten ranked first. The 10 facilities accounted for 21 percent of total TRI air releases of Proposition 65 chemicals in 2002.
- The TRI facility with the largest total air releases of Proposition 65 chemicals was the chemical manufacturer Lenzing Fibres Corp. in Lowland, Tennessee, reporting 8.0 million kg of on-site air releases of carbon disulfide. Carbon disulfide is listed as a developmental and reproductive toxin on the Proposition 65 list.
- The rubber and plastics products manufacturer Teepak in Danville, Illinois, reported the second-largest air releases of Proposition 65 chemicals in TRI, with over 1.3 million kg. Carbon disulfide was the primary Proposition 65 chemical released to the air by this facility.
- Among the 10 TRI facilities with the largest surface water discharges of California Proposition 65 chemicals, four were chemical manufacturers. The 10 facilities accounted for 21 percent of all surface water discharges of Proposition 65 chemicals reported to TRI for 2002.
- The Potlatch Corp. Idaho Pulp and Paperboard facility in Lewiston, Idaho, reported the largest surface water discharges of Proposition 65 chemicals in TRI, with over 20,000 kg. Acetaldehyde and formaldehyde were the Proposition 65 chemicals (linked to cancer) released to surface waters in the largest amounts from this facility.
- The chemical manufacturer, Albemarle Corp. in Orangeburg, South Carolina, reported the second-largest surface water discharges of Proposition 65 chemicals in TRI, with over 16,500 kg, mainly of formaldehyde.

9.3.3 Releases On- and Off-site of Chemicals Linked to Cancer, Birth Defects and Other Reproductive Harm (California Proposition 65 Chemicals), 1998–2002

This section analyses the 68 chemicals linked to cancer, birth defects or reproductive harm (California Proposition 65 chemicals) that have been consistently reported from 1998 to 2002. Reporting on nine chemicals (chlorendic acid, 3-chloro-2-methyl-1-propene, C.I. Direct Blue 218, 3,3'-dichlorobenzidine dihydrochloride, lithium carbonate, N-methyl-2-pyrrolidone, N-methylolacrylamide, potassium bromate, and tetracycline hydrochloride) is not included because these chemicals were added to NPRI in 1999. Also, mercury and lead and their compounds are not included because the threshold for these substances has been lowered since 1998.

- Total releases on- and off-site of the group of Proposition 65 chemicals decreased by 31 percent from 1998 to 2002, compared to a decrease of 11 percent for all matched chemicals.
- Total NPRI releases of Proposition 65 chemicals decreased by 25 percent from 1998 to 2002, including an 18-percent decrease in on-site releases and a 50-percent decrease in off-site releases (transfers to disposal).
- Total TRI releases of these chemicals decreased by 32 percent from 1998 to 2002, including a 32-percent decease in on-site releases and a 39-percent decrease in off-site releases.
- Toluene, a developmental toxicant, had the largest reported reductions in total releases on- and off-site from 1998 to 2002 of the Proposition 65 chemicals. The reduction for toluene was 33 percent, or 17.8 million kg.
- Acrylonitrile led the increases with 2.9 million kg, an increase of over 100 percent. One facility, the chemical manufacturer Solutia – Chocolate Bayou in Alvin, Texas, reported an increase of 3.0 million kg in on-site underground

Figure 9–5. Change in Total Releases On- and Off-site of Califormia Proposition 65 Chemicals in North America, 1998–2002



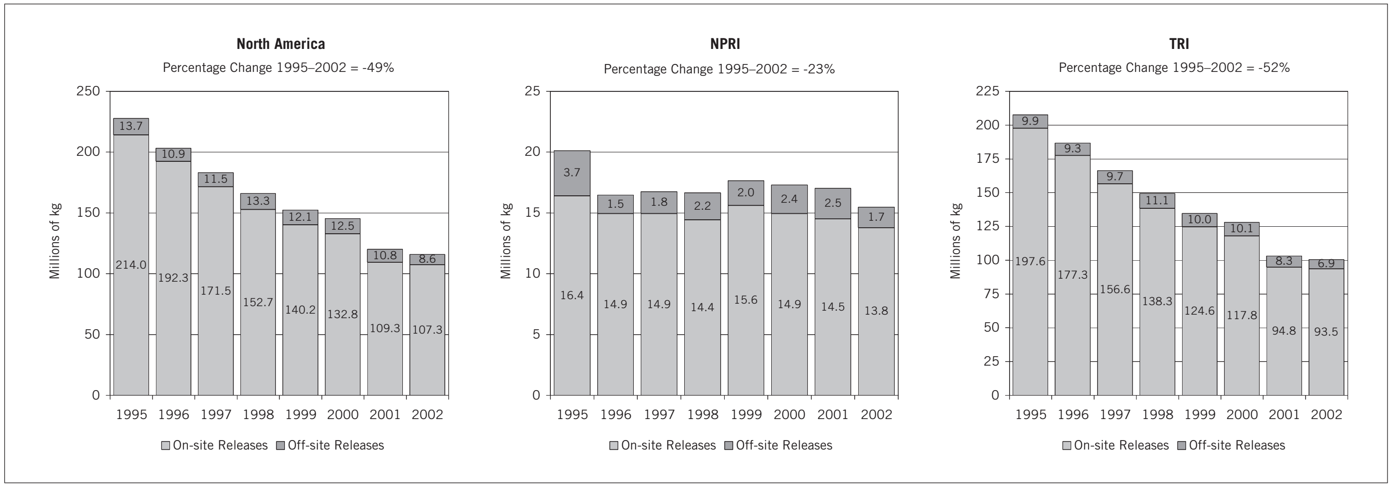
Note: Canada and US data only. Mexico data not available for 1998–2002. A chemical (and its compounds) is included if the chemical or any of its compounds is on the California Proposition 65 List. Off-site releases do not include those off-site releases also reported as on-site releases by another NPRI or TRI facility. Does not include lead and mercury and their compounds.

Table 9–17. Chemicals with Largest Change in Total Releases On- and Off-site of California Proposition 65 Chemicals in North America, 1998–2002

Rank	CAS Number		Chemical	Total Releases On- and Off-site (adjusted)* 1998 (kg)	1999 (kg)	2000 (kg)	2001 (kg)	2002 (kg)	Change 1998–2002 kg	%
Decreases										
1	108-88-3		Toluene	53,658,958	50,969,846	44,611,593	39,283,553	35,809,244	-17,849,714	-33
2	75-09-2	c,t	Dichloromethane	21,090,593	18,783,093	16,458,477	11,768,870	6,255,741	-14,834,851	-70
3	1332-21-4	c,t	Asbestos (friable)	15,138,587	11,351,217	15,329,572	11,267,640	4,138,309	-11,000,279	-73
4	75-15-0		Carbon disulfide	19,807,790	16,399,732	18,518,890	8,232,209	13,552,127	-6,255,663	-32
5	79-01-6	c,t	Trichloroethylene	6,886,341	5,609,617	5,175,491	4,664,501	4,459,625	-2,426,716	-35
Increases										
1	107-13-1	c,t	Acrylonitrile	2,348,377	2,595,067	2,433,381	5,214,133	5,264,586	2,916,209	124
2	79-06-1	c	Acrylamide	2,887,781	3,423,753	3,929,955	3,430,826	3,925,884	1,038,103	36
3	75-07-0	c,t	Acetaldehyde	6,333,786	6,800,839	7,142,300	6,879,709	7,239,457	905,671	14
4	110-86-1		Pyridine	309,191	489,057	490,427	389,188	546,719	237,527	77
5	123-91-1	c	1,4-Dioxane	343,139	479,032	294,258	426,552	520,809	177,671	52

Note: Canada and US data only. Mexico data not available for 1998–2002. A chemical (and its compounds) is included if the chemical or any of its compounds is on the California Proposition 65 List. Does not include lead and mercury and their compounds.
c = Known or suspected carcinogen.
t = CEPA Toxic chemical.
* Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

Figure 9–6. Change in Total Releases On- and Off-site of California Proposition 65 Chemicals in North America, 1995–2002



Note: Canada and US data only. Mexico data not available for 1995–2002. A chemical (and its compounds) is included if the chemical or any of its compounds is on the California Proposition List. Off-site releases do not include those off-site releases also reported as on-site releases by another NPRI or TRI facility. Does not include lead and merciry and their compounds.

Table 9–18. Chemicals with Largest Change in Total Releases On- and Off-site of California Proposition 65 Chemicals in North America, 1995–2002

				Total Releases On- and Off-site									
Rank	CAS Number		Chemical	1995 (kg)	1996 (kg)	1997 (kg)	1998 (kg)	1999 (kg)	2000 (kg)	2001 (kg)	2002 (kg)	Change 1995–2002 kg	%
Decreases													
1	108-88-3		Toluene	73,902,577	64,302,367	59,092,401	51,730,462	48,945,509	43,513,839	38,657,445	35,381,236	-38,521,341	-52
2	75-15-0		Carbon disulfide	38,195,290	33,116,048	23,247,372	19,807,360	16,399,598	18,518,287	8,231,799	13,551,832	-24,643,458	-65
3	75-09-2	c,t	Dichloromethane	28,559,898	26,809,611	24,279,705	20,760,378	18,442,995	16,262,246	11,526,922	6,164,167	-22,395,731	-78
4	79-01-6	c,t	Trichloroethylene	12,621,975	10,784,980	9,067,334	6,859,297	5,569,051	5,116,987	4,590,506	4,365,144	-8,256,831	-65
5	67-66-3	c	Chloroform	5,120,411	4,697,084	3,639,157	3,182,365	2,574,678	1,634,551	717,136	705,934	-4,414,477	-86
Increases													
1	107-13-1	c,t	Acrylonitrile	3,074,265	2,236,534	2,345,124	2,347,389	2,577,911	2,422,346	5,187,988	5,264,330	2,190,065	71
2	--	m,c,t	Nickel (and its compounds)	7,613,747	7,808,136	8,849,812	8,563,813	7,593,251	9,303,979	7,697,583	9,223,237	1,609,490	21
3	79-06-1	c	Acrylamide	2,859,445	2,687,843	3,294,204	2,887,644	3,418,037	3,929,948	3,423,909	3,925,878	1,066,433	37
4	50-00-0	c	Formaldehyde	10,064,020	11,233,696	11,576,344	11,552,350	12,691,158	13,061,146	11,492,639	10,482,847	418,826	4
5	75-07-0	c,t	Acetaldehyde	7,007,495	6,651,955	6,549,781	6,332,770	6,800,441	7,140,152	6,877,306	7,237,975	230,480	3

Note: Canada and US data only. Mexico data not available for 1995–2002. A chemical (and its compounds) is included if the chemical or any of its compounds is on the California Proposition List. Does not include lead and mercury and their compounds.
c = Known or suspected carcinogen.
m = Metal and its compounds.
t = CEPA Toxic chemical.

injection of acrylonitrile from 1998 to 2002. Acrylonitrile is linked to cancer on the Proposition 65 list.

9.3.4 Releases On- and Off-site of Chemicals Linked to Cancer, Birth Defects and Other Reproductive Harm (California Proposition 65 Chemicals), 1995–2002

Sixty-eight chemicals linked to cancer, birth defects and reproductive harm (California Proposition 65 chemicals) were consistently reported from 1995 to 2002. Reporting on nine Proposition 65 chemicals that were added to the NPRI list with the 1999 reporting year, as well as mercury and lead and their compounds, whose reporting thresholds were lowered, is not included when comparing trends from 1995 to 2002. Also, only the manufacturing industry sectors (US SIC codes 20–39) are included.

- Total releases on- and off-site of the Proposition 65 chemicals decreased by 49 percent from 1995 to 2002, compared to a decrease of 12 percent for all matched chemicals.
- Total releases of Proposition 65 chemicals reported by NPRI facilities decreased by 23 percent, with much of the reduction in the period from 1999 to 2002.
- Total releases of Proposition 65 chemicals reported by TRI facilities decreased by 52 percent, with steady reductions throughout the period from 1995 to 2002.
- Toluene, a developmental toxicant, had the largest reported reductions in total releases on- and off-site from 1995 to 2002 of the chemicals linked to cancer, birth defects or reproductive harm, with a 52-percent reduction, or 38.5 million kg.
- Acrylonitrile led the increases with 2.2 million kg, or 71 percent. Acrylonitrile is linked to cancer on the Proposition 65 list. Nickel and its compounds and acrylamide both showed increases of over one million kg. Under Proposition 65, nickel

is listed as a carcinogen and certain nickel compounds are listed as carcinogens or developmental toxins. Acrylamide is linked to cancer on the Proposition 65 list.

9.4 Reporting on Arsenic and Cadmium

Two chemicals, arsenic and cadmium and their compounds, are no longer in the matched database because reporting thresholds have been lowered in NPRI but not in TRI. NPRI lowered the reporting thresholds for these chemicals from 10 tonnes to 50 kg manufactured, processed or otherwise used during a calendar year starting with the 2002 reporting year. These substances are included in both the known or suspected carcinogen and the California Proposition 65 (chemicals linked to cancer, birth defects and other reproductive harm) lists. The following shows the effect of the lowered reporting thresholds on NPRI reporting.

- In 2002, 212 NPRI facilities reported on arsenic and its compounds. There were 110 "newly reporting" facilities (i.e., facilities that did not report arsenic and its compounds for 2001). These "newly reporting" facilities represented over half of all NPRI facilities reporting on arsenic and its compounds in 2002 and reported 11 percent of total releases and 2 percent of transfers to recycling of arsenic and its compounds in 2002.
- Arsenic and inorganic compounds are classified as carcinogenic to humans under IARC (Group 1) and known to be carcinogenic under NTP. Inorganic arsenic compounds are listed as carcinogens and developmental toxins on the California Proposition 65 list.
- In 2002, 281 NPRI facilities reported on cadmium and its compounds. There were 244 "newly" reporting facilities (i.e., facilities that did not report cadmium and its compounds for 2001). These "newly" reporting facilities represented 87 percent of all NPRI facilities reporting on cadmium and its compounds in 2002 and reported 10 percent of total releases and 5 percent of transfers to recycling of cadmium and its compounds in 2002.
- Cadmium and cadmium compounds are classified as carcinogenic to humans under IARC (Group 1) and known to be carcinogenic under NTP. Cadmium and cadmium compounds are listed as carcinogens and cadmium is a developmental toxin on the California Proposition 65 list.

Table 9–19. New NPRI Facilities Reporting under Lowered Threshold, Arsenic and Cadmium and their Compounds, 2002

	Arsenic and its Compounds					Cadmium and its Compounds				
	Facilities Reporting for 2001 and 2002		"New" Facilities: Reporting for 2002 and not 2001		All Facilities Reporting	Facilities Reporting for 2001 and 2002		"New" Facilities: Reporting for 2002 and not 2001		All Facilities Reporting
	Number	Percent of All Facilities	Number	Percent of All Facilities	Number	Number	Percent of All Facilities	Number	Percent of All Facilities	Number
Total Facilities	102	48	110	52	212	37	13	244	87	281
Releases On- and Off-site	**kg**	**%**	**kg**	**%**	**kg**	**kg**	**%**	**kg**	**%**	**kg**
On-site Releases	**286,752**	**92**	**23,516**	**8**	**310,268**	**180,145**	**94**	**10,521**	**6**	**190,666**
Air	161,403	99	2,127	1	163,530	35,474	95	1,797	5	37,271
Surface Water	6,698	54	5,679	46	12,377	626	25	1,914	75	2,540
Underground Injection	0	--	0	--	0	0	39	0.14	61	0.23
Land	118,652	88	15,709	12	134,361	144,044	95	6,810	5	150,854
Off-site Releases (Transfers of Metals)*	**158,590**	**83**	**32,781**	**17**	**191,372**	**166,246**	**85**	**28,672**	**15**	**194,918**
Total Reported Releases On- and Off-site	**445,343**	**89**	**56,297**	**11**	**501,640**	**346,390**	**90**	**39,193**	**10**	**385,584**
Off-site Transfers to Recycling	**486,742**	**98**	**10,736**	**2**	**497,478**	**192,275**	**95**	**10,584**	**5**	**202,860**
Total Reported Amounts of Releases and Transfers	**932,085**	**93**	**67,033**	**7**	**999,118**	**538,666**	**92**	**49,778**	**8**	**588,444**

* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

10

Persistent Bioaccumulative Toxic Chemicals

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Key Findings

Lead and Lead Compounds

- Reporting on lead and its compounds changed for the 2001 reporting year in TRI and for the 2002 reporting year in NPRI. The reporting threshold was lowered from approximately 10 tonnes to approximately 50 kg manufactured, processed or otherwise used during a calendar year. More facilities are now subject to reporting, thus we have a more complete picture of releases and transfers of lead from industrial sources.
- Lead is a persistent, bioaccumulative toxic substance that can cause developmental damage, especially in children. It is a probable human carcinogen and a recognized developmental and reproductive toxic (California Proposition 65). Lead is considered a hazardous air pollutant under the US Clean Air Act and a Priority Pollutant under the US Clean Water Act. Lead and its compounds are considered toxic under the Canadian Environmental Protection Act.
- In 2002, 8,703 facilities in North America in the matched industry sectors reported on releases and transfers of lead and its compounds. Under the higher thresholds in 2000, 2,116 facilities had reported.
- Over 43.3 million kg of lead and its compounds were released on- and off-site in 2002. Eight percent (3.5 million kg) was from NPRI facilities, and 92 percent (39.9 million kg) was from TRI facilities.
- Over 960,000 kg of on-site air emissions of lead and its compounds were reported in 2002, with NPRI facilities accounting for 42 percent and TRI facilities for 58 percent. Almost half of the air emissions were from nine primary metals facilities and one electric utility. Five of the top 10 facilities were located in Canada and five in the United States.
- The primary metals sector and hazardous waste management facilities reported the largest total releases on- and off-site, mainly due to on- and off-site land disposal. Primary metals had the largest on-site air emissions. Electric utilities had the largest surface water discharges, second-largest on-site air emissions and the third-largest on-site land disposal.
- In 2002, total releases and transfers of lead and its compounds was 211.2 million kg with over three-quarters of that amount reported as transfers to recycling. The electronic/electrical equipment industry reported 55 percent of all transfers to recycling of lead and its compounds in 2002.
- Reporting on releases and transfers of lead under the higher thresholds can be compared from 1995 to 2000. Total releases decreased by 1 percent from 1995 to 2000, as reported by the manufacturing sectors. From 1998 to 2000, total releases and transfers of lead and its compounds decreased by 19 percent, as reported by all industry sectors in the matched data set.

Mercury and Mercury Compounds

- Mercury is a persistent, bioaccumulative toxic chemical that can cause neurological and developmental damage, especially in children. Mercury is on the Proposition 65 list of chemicals as a developmental toxicant and has been declared toxic under the Canadian Environmental Protection Act.
- Reporting thresholds for mercury and its compounds are lower than for most other chemicals on the NPRI and TRI lists. They were lowered from approximately 10 tonnes to approximately 5 kg beginning with the 2000 reporting year, giving a more complete picture of releases and transfers of mercury from industrial sources.
- In 2002, 1,787 facilities in North America reported more than 453,000 kg of releases and transfers of mercury and its compounds. Over half (55 percent) was released on- and off-site, with 45 percent transferred to recycling.
- In 2002, 65,901 kilograms of mercury and its compounds were released into the air, mainly from electric utilities. Electric utilities also discharged the largest amount of mercury and its compounds to the water and the third-largest amount of mercury and its compounds to on-site land disposal of any sector. Given the large amounts of mercury released to the air, land and water, the electric utility sector had the largest on-site releases.
- The jurisdictions with the largest mercury and its compounds released to the air in 2002 were Texas, Ohio, Pennsylvania, Indiana, and Alabama.
- The hazardous waste sector injected 8,388 kilograms of mercury and its compounds underground in 2002, 92 percent of the total amount injected underground.
- Total reported releases on- and off-site decreased by 57 percent from 2000 to 2002 in North America. NPRI releases of mercury and its compounds decreased by 26 percent and TRI releases decreased by 58 percent.

Dioxins and Furans

- Dioxins and furans are persistent, bioaccumulative toxic chemicals. Some members of the dioxin and furan family are carcinogens, suspected endocrine disruptors, and suspected neurological, developmental and reproductive toxicants. Dioxins and furans are formed during incomplete combustion, and air releases are the major type of release.
- Reports on dioxins and furans were required for the first time by NPRI and TRI for the 2000 reporting year. However, the reporting requirements differed so the PRTR data on dioxins and furans from the two countries are not comparable.
- About 5 percent of all TRI facilities reported on dioxins and furans in 2002. TRI facilities reported a decrease of 12.5 percent in releases on- and off-site of dioxins and furans from 2000 to 2002 (in grams-iTEQ), with chemical manufacturers reporting the largest amounts.

- About 11 percent of all NPRI facilities reported on dioxins and furans in 2002. Depending on their activities or the processes they use, only certain NPRI facilities must report on dioxins and furans.
- NPRI facilities required to report on dioxins and furans reported a decrease of 32 percent in total releases on- and off-site from 2000 to 2002. The paper products industry reported the largest amounts in both 2000 and 2002, with a decrease of 40 percent for that time period.

Hexachlorobenzene

- Hexachlorobenzene is a persistent, bioaccumulative toxic chemical and a probable carcinogen. It stays in the atmosphere a long time and can be transported long distances.
- For the 2000 reporting year, reports on hexachlorobenzene (HCB) were required for the first time by NPRI, and reporting thresholds were lowered under TRI. However, the reporting requirements differ so the PRTR data on hexachlorobenzene from the two countries are not comparable.
- TRI facilities reported a decrease of more than 30,700 kg, or 46 percent, in total reported releases and transfers of hexachlorobenzene from 2000 to 2002. One chemical facility accounted for much of the reduction, reporting a decrease in amounts sent to energy recovery of over 24,700 kg.
- NPRI facilities reported an increase of over 404 kg from 2000 to 2002. One facility accounted for this increase, reporting over 384 kg of hexachlorobenzene in 2002 in waste sent to an incinerator (transferred off-site for treatment).

Polycyclic Aromatic Compounds

- PACs are persistent, bioaccumulative toxics. Some members are probable carcinogens, developmental toxins and endocrine disruptors. Combustion byproducts are the main source of PACs.
- Reports on polycyclic aromatic compounds (PACs) were required for the first time in NPRI at an alternative threshold for 2000. However, reporting requirements differ so the PRTR data on PACs from the two countries are not comparable.
- Total releases and transfers of PACs listed under NPRI showed a decrease of 10 percent from 2000 to 2002, with total releases on- and off-site decreasing by 15 percent.
- For the PACs listed on TRI at the lower thresholds, total releases and transfers decreased by 31 percent from 2000 to 2002, with on- and off-site releases decreasing but transfers to recycling increasing.

10.1 Introduction

This chapter presents analyses of persistent bioaccumulative toxic (PBT) chemicals, including:

- lead and its compounds,
- mercury and its compounds,
- dioxins and furans,
- hexachlorobenzene, and
- polycyclic aromatic compounds.

These chemicals are of environmental and health concern as they are toxic, can accumulate in the environment, are not easily broken down, can travel large distances, and may have a number of health effects including cancer, neurological harm, and reproductive damage. These chemicals have lower reporting thresholds than other chemicals. However, except for lead and mercury and their compounds, their reporting requirements differ, so the NPRI and TRI data are presented separately and cannot be compared. As part of the CEC *Action Plan to Enhance Comparability of PRTRs in North America*, governments are developing methods to make these PBT data more comparable in the future.

10.2 Lead and its Compounds

Lead is a persistent, bioaccumulative compound with health and environmental effects. The following section provides information on lead and its compounds from the matched data for 2002, the first year of reporting under the lower threshold for both NPRI and TRI.

This year, the *Taking Stock* report focuses on lead and its compounds because lead:

- is a persistent, toxic, bioaccumulative compound;
- has significant health effects, especially in children;
- is still found at high levels in some urban and industrial areas;
- was reported for the first time at lower thresholds in both TRI and NPRI, resulting in an improved North American picture; and
- was identified as a priority for detailed analysis at the CEC PRTR Consultative Group meeting.

10.2.1 Lead: Sources and Effects

Sources

Lead is a metal originally produced by the mining and smelting of ores and secondarily captured through recycling. It is found in a wide variety of everyday consumer products: lead-acid batteries used in vehicles, pigments, plastics, glass, electronics such as computers, plumbing, cigarettes, ammunition, and consumer products such as jewelry and pottery. Lead is considered a high–production-volume chemical, with production exceeding 1 million pounds [some 454,000 kg] in the United States. Lead can combine with other chemicals to make a number of different compounds, such as lead oxide, lead acetate and lead phosphate.

In the 1970s of the total US lead emissions to air of 221,000 tons [200,454 metric tonnes], the major sources of lead emissions to the environment were from burning leaded fuel in cars and trucks (about 80 percent of the total or 176,800 tons [160,363 metric tonnes]) and industrial sources such as metal processing (about 11 percent or 24,310 tons [22,050 metric tonnes]). With the phase-out of leaded gas, the amount of lead emitted to the air has decreased, leaving the major sources of lead emissions as metals processing (20,358 tons [18,465 metric tonnes] in 1997), incinerators (626 tons [568 metric tonnes]), power plants (509 tons [462 metric tonnes]) and battery manufacturers and others (235 tons [213 metric tonnes]) (EPA 2003).

Environmental Effects of Lead

Most of the lead in the environment is from air emissions (ATSDR 1999). Lead bound to small particles can travel thousands of miles from its source. Lead in the air can be deposited onto the ground or water by dry fallout or with rain, snow or fog. Lead can be absorbed into soil and sediment, and remain for long periods of time. When soil or sediment is disturbed through construction or dredging, lead can become mobilized. Lead has limited uptake into plants. Lead levels in urban areas can be high due to local sources, historical contributions from lead in gasoline or paints, and long-range transport.

Lead tends to accumulate in animals over time, so often body burdens increase as animals age. Lead can be toxic to aquatic biota, especially fish, where it can cause excess formation of mucous that coats the gills and restricts breathing (Rompala *et al.* 1984). Wildlife have been killed or damaged by ingesting lead shot or lead fishing lures and sinkers. Ingesting lead sinkers and jigs accounted for 22 percent of recorded causes of death in loons in Canada. In the United States, bald and golden eagles show elevated lead levels. In Mexico, elevated lead levels have been found in flamingos (CEC 2004). As a result, some jurisdictions have restricted the use of lead in shot, sinkers and lures.

Routes of Exposure to Lead

People can become exposed to lead through contact with:

- Deteriorating lead-based paint
- Lead-contaminated dust
- Lead-contaminated residential soil
- Lead-contaminated consumer products, such as costume jewelry, pottery, art supplies
- Drinking water passing through leaded pipes, leaded solder
- Cigarette smoke
- Local sources such as mines, smelters, lead-acid battery manufacturing or crushing plants, and some industrial sites
- Working in a metal processing plant, battery plant, or electronics plant
- Exposure to clothes and materials of a person working in a plant with lead
- Lead-contaminated mothers' blood *in utero*

Health Effects of Lead

Lead is a persistent, bioaccumulative toxic chemical. It is a probable human carcinogen and a recognized developmental and reproductive toxic (California Proposition 65) and is considered a hazardous air pollutant under the US Clean Air Act and a Priority Pollutant under the US Clean Water Act. Lead and its compounds are considered toxic under the Canadian Environmental Protection Act. Some scientists consider lead to show toxic effects on the kidneys, on the respiratory system, the immune system, the endocrine system, and act as a neurotoxin (Scorecard 2005).

Children are especially sensitive to lead. It can damage a child's developing brain, kidneys and reproductive system. Even low levels of lead are associated with learning disabilities, behavioral problems, impaired growth and hearing loss (Needleman and Bellinger 1991). Exposure to low levels of lead can stunt the growth of children *in utero* and to adolescence.

Because of their developing systems, children exposed to the same level of lead will absorb more than adults. An infant may absorb up to 50 percent of lead through their intestines, while an adult may absorb only 10 percent (Plunkett *et al.* 1992). Babies also have an immature blood brain barrier, which allows lead to pass more easily into brain tissue (Rodier 1995).

As our knowledge of the health effects of lead increases, the level of lead considered safe has steadily decreased. Now many researchers believe that there may not be any safe threshold for lead's impact on human health. Organizations such as the US Center for Disease Control and Prevention use a blood lead level of 10 micrograms per deciliter of blood as the intervention level for action. They recognize that health effects of lead may occur below this action level.

A very high proportion of lead is stored in the bones, where it accumulates over time and remains for long periods. The half-life (time for the body to excrete half the accumulated lead) is about 25 years. Therefore, high lead concentrations can stay in the body for many years after exposure to lead has stopped. During periods of stress (pregnancy or serious illness, for example), or during aging, the lead stored in bones is released into the bloodstream. Individuals may therefore be at risk for release of stored lead into the bloodstream throughout their lifetime (Health Canada 2002).

Research is also demonstrating that lead is an intergenerational issue. Mothers who were exposed to lead in the past had higher levels of lead in their bones and gave birth to infants with impaired mental development. Cognitive development was more affected than motor skill development. This research shows that it is important to lower the amount of lead a mother is exposed to, not only during pregnancy, but also in the years before pregnancy (Gomaa 2002).

In addition to being intergenerational, the effects of lead can also be irreversible. Each increase of 10 µg of lead per deciliter of blood is associated with a four to seven point decrease in IQ (Needleman et al. 1990). Adolescents who as children had high lead levels in their teeth in Grades 1 and 2 were seven times more likely to be high school dropouts and six times more likely to read at least two grades below expectation (Needleman *et al.* 1990). They also showed higher rates of absenteeism in their final year of school, along with lower class rank, poorer vocabulary, lower grammatical scores, longer reaction time and poorer hand-eye coordination. Delinquency rates are eight times higher in people with the highest 30 percent of lead levels in bones (Needleman 1996). Measurable adverse behavioral changes were observed in two-year-olds with high lead levels (Mendelsohn 1999).

Lead is also harmful to adults. Adults can suffer from difficulties during pregnancy, other reproductive problems (in both men and women), high blood pressure, digestive problems, nerve disorders, memory and concentration problems and muscle and joint pain (ATSDR 1999).

Lead levels in North America

In air: Concentrations of lead in the environment increased following the introduction in the 1920s of lead additives in automobile gasoline. Then, between 1973 and 1985 in Canada, airborne lead concentrations fell considerably due to the phasing out of leaded gas (Health Canada 2002).

In the United States, the air emissions of lead from all sources fell from 221,000 imperial tons (200,455 metric tonnes) in 1970 to 3,915 tons (3,551 metric tonnes) in 1997. The concentration of lead in air decreased by 94 percent from 1983 to 2002 (EPA 2003).

In people: In 1978, there were three to four million children with elevated blood lead levels in the United States. In 1994–1995 the number of children at risk from elevated blood lead levels had dropped to 890,000 children, or about 4 percent. The latest body burden test, in 1999–2000, found a further decline in number of children at risk to 434,000 kids, or about 2 percent of the US children aged 1 to 5 (CDCP 2004). However, the report estimates higher blood lead levels in African-American and Hispanic people. Some older Americans show higher levels from prior exposures.

There is no similar national blood lead survey in Canadian or Mexican children. Some local information can be obtained from regional studies.

Actions to reduce lead levels

All three countries have taken actions to reduce lead levels in the environment and to reduce lead exposure. These measures include:

- Elimination of lead in gasoline for cars
- Reduction of lead content in paints
- Reduction of lead solder in food cans
- Reduction of lead content in pottery
- Reduction of concentration and/or use of lead solder in plumbing
- Setting limits on lead emissions from smelters
- Setting limits on other industrial lead sources, such as battery manufacturers
- Setting standards for maximum levels of lead in air and water
- Monitoring lead levels in the environment
- Creating lead risk reduction plans

Additional Resources

Canada: Environment Canada <http://www.ec.gc.ca> and Health Canada <http://www.hc-sc.gc.ca/ hecs-sesc/toxics_management/publications/ leadQandA/toc.htm>

United States: US Environmental Protection Agency <http://www.epa.gov/lead/> and US National Lead Information Center at <http://www.epa.gov/lead/nlic.htm> or call 1-(800)-424-LEAD [5323].

Mexico: *Instituto Nacional de Ecología* <http://www.ine.gob.mx/dgicurg/sqre/avanceplomo.html>

CEC: <http://www.cec.org/files/PDF/POLLUTANTS/ Lead-Public-consult_en.pdf>

10.2.2 Releases and Transfers of Lead and its Compounds, 2002

Total reported releases and transfers of lead and its compounds consist of on-site releases to air, surface water, underground injection, and land occurring at the reporting facility; off-site releases (transfers to disposal); and transfers to recycling. Any reported transfers to energy recovery, treatment, or sewage are included as transfers to disposal.

- In 2002, 8,703 facilities—443 in NPRI and 8,260 in TRI—reported 211.2 million kg of lead and its compounds released or transferred by the matched set of industries.
- Over 43.3 million kg of lead and its compounds were released on- and off-site in 2002. Eight percent (3.5 million kg) was from NPRI facilities, and 92 percent (39.9 million kg) was from TRI facilities.
- On-site releases represented 13 percent of the TRI total and 5 percent of the NPRI total. For both NPRI and TRI, land disposal was the largest type of on-site release.
- Over 960,000 kg of on-site air emissions of lead and its compounds were reported in 2002. While NPRI facilities represented 5 percent of facilities reporting lead and its compounds, they accounted for 42 percent of the on-site air emissions.
- Off-site transfers to recycling represented more than three-quarters (77 percent or 162.8 million kg) of the total. For NPRI, the percentage of the total sent off-site for recycling was higher (89 percent).

Table 10–1. Summary of Total Reported Amounts of Releases and Transfers in North America for Lead and its Compounds, NPRI and TRI, 2002

	North America		NPRI*		TRI		NPRI as % of North American Total	TRI as % of North American Total
	Number		Number		Number			
Total Facilities	8,703		443		8,260		5	95
Total Forms	8,783		449		8,334		5	95
Releases On- and Off-site	**kg**	**%**	**kg**	**%**	**kg**	**%**		
On-site Releases	**24,811,698**	**12**	**2,015,794**	**5**	**22,795,903**	**13**	**8**	**92**
Air	960,623	0.5	401,546	1	559,077	0.3	42	58
Surface Water	67,179	0.03	7,595	0.02	59,583	0.03	11	89
Underground Injection	139,038	0.1	74	0.000	138,964	0.1	0	100
Land	23,644,857	11	1,606,578	4	22,038,279	13	7	93
Off-site Releases (Transfers of Metals)**	**23,542,903**	**11**	**2,122,949**	**6**	**21,419,953**	**12**	**9**	**91**
Total Reported Releases On- and Off-site	**48,354,601**	**23**	**4,138,744**	**11**	**44,215,857**	**25**	**9**	**91**
Off-site Releases Omitted for Adjustment Analysis***	5,038,351		674,363		4,363,988			
Total Reported Releases On- and Off-site (adjusted)*****	**43,316,249**		**3,464,380**		**39,851,869**		**8**	**92**
Off-site Transfers to Recycling	**162,802,260**	**77**	**32,909,104**	**89**	**129,893,155**	**75**	**20**	**80**
Total Reported Amounts of Releases and Transfers	**211,156,860**	**100**	**37,047,848**	**100**	**174,109,012**	**100**	**18**	**82**

Note: Canada and US data only. Mexico data not available for 2002. Data are NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data, in combination with other information, can be used as a starting point in evaluating exposures that may result from releases and other management activities which involve these chemicals.

* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

** Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

*** Off-site releases also reported as on-site releases by another NPRI or TRI facility. This amount is subtracted from total reported releases on- and off-site to get total releases on- and off-site (adjusted).

**** Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

Figure 10–1. Percent of Releases and Transfers of Lead and its Compounds by Type, NPRI and TRI, 2002

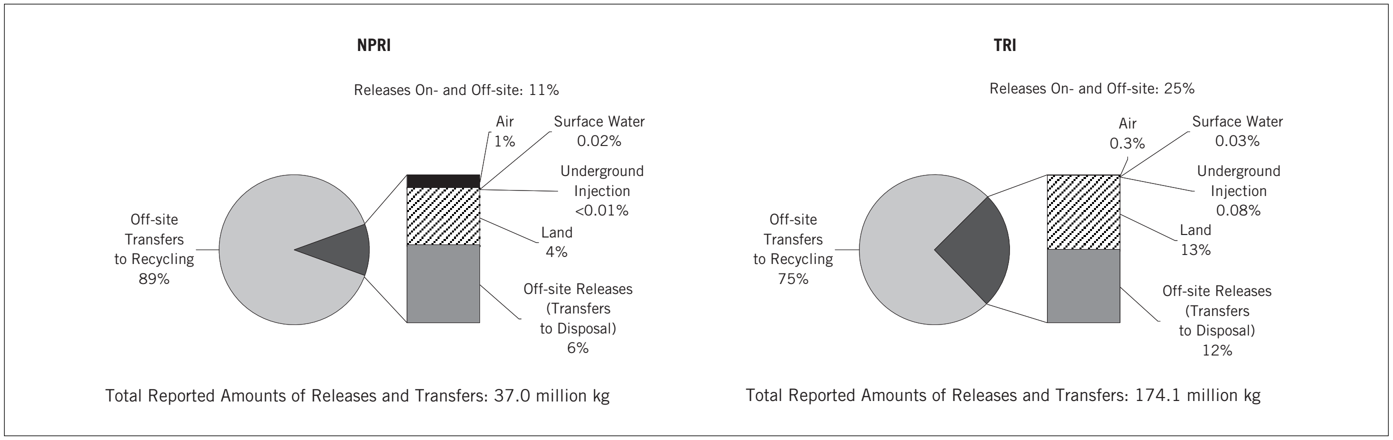
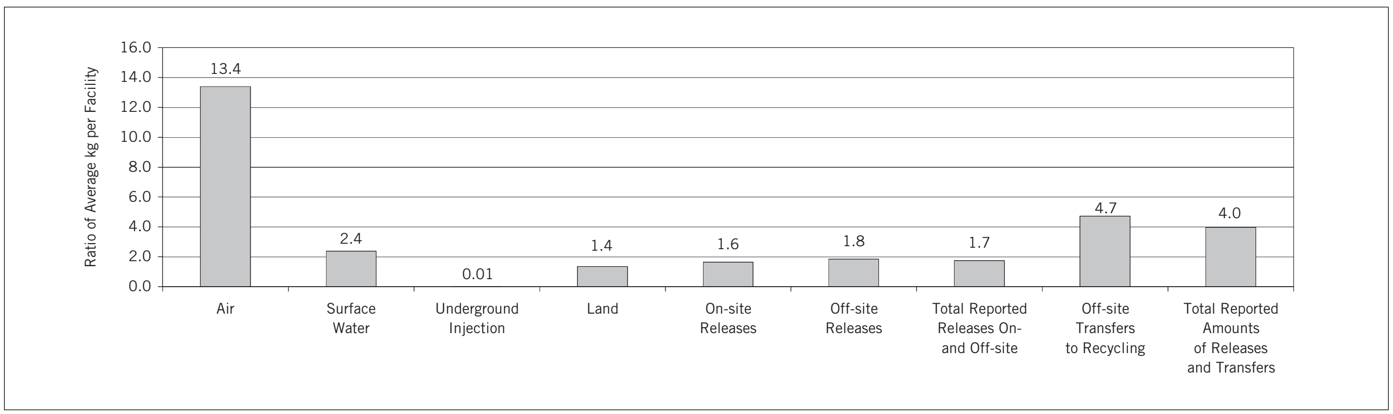


Figure 10–2. NPRI/TRI Ratio of Average Releases and Transfers of Lead and its Compounds per Facility, 2002



- Average releases and transfers per facility were about four times higher in NPRI than in TRI. On-site air releases were more than 13 times higher on average (NPRI/TRI ratio of 13.4), and transfers to recycling were almost five times higher in NPRI than in TRI.
- The NPRI to TRI ratio of per-facility average for total on-site releases was 1.6; for off-site releases (transfers to disposal), it was 1.8.

Releases On- and Off-site, 2002

Releases On- and Off-site By State/Province

Almost one-quarter of all North American releases originated in three states.

- Missouri reported the largest releases of lead and its compounds, with 3.7 million kg, or 8 percent of the North American total. It reported the fourth-largest air emissions and on-site land disposal and the fifth-largest off-site releases (transfers to disposal).
- Alabama reported the second-largest releases with 3.435 million kg (almost 8 percent of the North American total) and the largest on-site land disposal.
- Ohio reported the third-largest total releases, 3.434 million kg (almost 8 percent of the North American total). Ohio had the fourth-largest off-site releases (transfers to disposal) and the fifth-largest on-site land disposal.
- The province of Ontario had the largest on-site air emissions, with 145,000 kg, representing 15 percent of all on-site air emissions of lead and its compounds in 2002. The provinces of Quebec and Manitoba had the second- and third-largest air emissions.
- The state of New York had the largest on-site surface water discharges, with almost 14,000 kg, representing 20 percent of all surface water discharges of lead and its compounds in 2002. The state of Louisiana had the second-largest surface water discharges.

Table 10–2. Releases On- and Off-site of Lead and its Compounds in North America, by State/Province, 2002

State/Province	Number of Facilities	On-site Releases: Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site kg	Rank	Adjustment Component* (kg)	Total Releases (adjusted)** kg	Rank
Alabama	217	26,070	3,576	2,313	3,099,311	3,131,270	622,621	3,753,891	1	318,540	3,435,351	2
Alaska	7	786	5	0	8	798	390	1,188	60	389	800	60
Alberta	36	1,648	196	23	155,065	156,932	191,842	348,774	33	77,164	271,611	32
Arizona	101	5,073	7	40	2,195,951	2,201,072	20,368	2,221,440	9	7,123	2,214,317	9
Arkansas	117	7,325	900	0	51,309	59,534	332,566	392,099	27	252,007	140,092	40
British Columbia	40	2,658	2,406	0	6,381	11,444	162,515	173,959	41	43,691	130,269	42
California	542	6,044	608	2	1,413,752	1,420,406	716,851	2,137,257	10	632,433	1,504,824	12
Colorado	94	2,598	122	0	53,885	56,604	56,240	112,844	45	10,442	102,402	44
Connecticut	147	1,233	87	0	30	1,350	2,573,451	2,574,802	8	151,150	2,423,652	7
Delaware	20	1,679	312	0	7,697	9,688	29,214	38,902	49	4	38,899	48
District of Columbia	1	0	0	0	0	0	127	127	63	0	127	63
Florida	235	12,365	704	0	251,035	264,103	111,973	376,076	30	1,620	374,457	24
Georgia	210	10,155	1,007	0	154,398	165,559	127,828	293,387	36	1,804	291,583	31
Guam	4	13	0	0	38	51	0	51	64	0	51	64
Hawaii	14	2,118	10	2	1	2,131	1,758	3,889	59	14	3,875	59
Idaho	35	583	75	0	1,105,002	1,105,660	21,585	1,127,245	14	2,815	1,124,430	14
Illinois	427	25,294	4,161	0	789,156	818,611	1,060,332	1,878,943	12	283,345	1,595,598	11
Indiana	394	40,016	2,351	454	467,922	510,742	2,392,891	2,903,633	4	151,645	2,751,988	4
Iowa	120	11,295	755	0	67,809	79,859	421,637	501,496	23	293,255	208,241	35
Kansas	92	11,850	31	0	65,827	77,709	2,612,050	2,689,759	5	79,560	2,610,199	5
Kentucky	180	12,564	2,519	1,098	302,020	318,201	47,789	365,990	31	10,215	355,776	26
Louisiana	112	8,473	7,767	98	425,777	442,115	78,877	520,992	22	1,968	519,024	20
Maine	41	745	703	0	3,019	4,468	7,758	12,226	53	1,754	10,472	53
Manitoba	9	112,016	469	0	226	112,711	82,622	195,333	38	0	195,333	36
Maryland	63	3,480	110	31	41,032	44,652	55,408	100,061	46	3	100,058	45
Massachusetts	236	4,459	10	0	1,659	6,129	160,459	166,587	42	16,220	150,367	39
Michigan	335	14,637	923	1	133,456	149,018	396,527	545,545	21	8,060	537,485	19
Minnesota	155	5,129	543	0	94,281	99,953	217,893	317,846	35	1,618	316,228	29
Mississippi	126	4,502	373	129,837	30,691	165,402	23,070	188,472	39	157	188,315	37
Missouri	197	90,637	186	0	1,888,361	1,979,184	1,695,864	3,675,049	2	479	3,674,569	1
Montana	18	1,036	203	0	31,364	32,603	1,905	34,509	50	4	34,505	49
Nebraska	61	5,998	46	0	37,424	43,468	1,028,598	1,072,066	15	709,806	362,259	25
Nevada	30	25,554	0	0	1,175,967	1,201,521	1,090	1,202,611	13	277	1,202,334	13
New Brunswick	13	9,212	754	0	3,470	13,437	473,303	486,740	24	470,566	16,174	51
New Hampshire	65	138	0	0	259	397	28,580	28,977	51	0	28,977	50
New Jersey	168	4,909	27	0	5,977	10,912	460,193	471,105	25	4,397	466,708	22
New Mexico	26	862	1	0	73,161	74,024	47,406	121,430	44	0	121,430	43
New York	287	10,906	13,596	0	170,276	194,778	186,356	381,133	29	2,970	378,163	23
Newfoundland and Labrador	2	177	0	0	0	177	0	177	62	0	177	62
North Carolina	293	8,673	951	0	184,052	193,676	198,005	391,681	28	76,732	314,949	30
North Dakota	18	3,596	205	0	50,210	54,011	81,038	135,049	43	0	135,049	41
Northern Marianas	3	1	0	0	1	2	0	2	65	0	2	65
Nova Scotia	9	0	0	0	10,851	10,851	10,299	21,150	52	7,885	13,265	52
Ohio	588	35,491	2,071	4,535	1,570,629	1,612,726	2,011,508	3,624,234	3	190,618	3,433,616	3
Oklahoma	96	4,796	147	202	100,925	106,069	79,718	185,787	40	2,153	183,635	38
Ontario	238	145,426	1,912	0	1,246,948	1,394,286	581,942	1,976,228	11	75,037	1,901,191	10
Oregon	108	2,770	1,453	0	441,309	445,533	232,533	678,065	18	206,119	471,947	21
Pennsylvania	490	38,075	2,896	0	1,280,286	1,321,257	1,338,773	2,660,030	7	299,803	2,360,227	8
Prince Edward Island	2	0	0	0	0	0	5,863	5,863	58	7	5,856	58
Puerto Rico	35	1,392	78	0	4,691	6,161	5,210	11,371	54	2,652	8,719	55
Quebec	89	127,194	1,751	51	179,952	308,948	267,323	576,272	20	15	576,257	18
Rhode Island	54	2,601	6	0	0	2,607	4,480	7,087	57	38	7,049	57
Saskatchewan	5	3,215	108	0	3,685	7,008	347,241	354,249	32	0	354,249	27
South Carolina	169	10,671	1,361	0	84,650	96,682	352,010	448,692	26	222,378	226,314	34
South Dakota	29	149	279	0	9,168	9,596	882	10,478	55	231	10,247	54
Tennessee	210	11,679	2,078	0	262,638	276,395	400,408	676,804	19	7,325	669,479	17
Texas	423	34,476	2,035	352	637,418	674,282	328,354	1,002,636	16	145,309	857,327	15
Utah	63	5,760	103	0	2,351,702	2,357,565	311,851	2,669,416	6	245,443	2,423,973	6
Vermont	17	127	7	0	294	429	7,128	7,557	56	69	7,489	56
Virgin Islands	3	355	0	0	78	433	180	614	61	107	506	61
Virginia	189	19,555	583	0	103,118	123,256	210,420	333,676	34	379	333,297	28
Washington	140	1,572	972	0	72,716	75,259	20,772	96,031	47	2,270	93,761	46
West Virginia	106	6,883	1,046	0	667,311	675,240	66,678	741,918	17	1,260	740,658	16
Wisconsin	326	9,509	1,585	0	16,654	27,748	220,301	248,050	37	17,030	231,020	33
Wyoming	23	2,421	9	0	62,575	65,005	10,050	75,054	48	2	75,052	47
Total	**8,703**	**960,623**	**67,179**	**139,038**	**23,644,857**	**24,811,698**	**23,542,903**	**48,354,601**		**5,038,351**	**43,316,249**	

Note: Canada and US data only. Mexico data not available for 2002. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings are meant to imply that a facility, state or province is not meeting its legal requirements. The data do not predict levels of exposure of the public to those chemicals.

* Off-site releases also reported as on-site releases by another NPRI or TRI facility. This amount is subtracted from total reported releases on- and off-site to get total releases (adjusted).

** Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

Table 10–3. Releases On- and Off-site of Lead and its Compounds in North America, by Industry, 2002

US SIC Code	Industry	On-site Releases: Air (kg)	On-site Releases: Surface Water (kg)	On-site Releases: Underground Injection (kg)	On-site Releases: Land (kg)	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site kg	Total Reported Releases On- and Off-site Rank	Adjustment Component* (kg)	Total Releases (adjusted)** kg	Total Releases (adjusted)** Rank
33	Primary Metals	631,641	12,947	1,044	9,240,104	9,885,735	10,643,242	20,528,977	1	3,628,943	16,900,034	1
495/738	Hazardous Waste Mgt./Solvent Recovery	6,468	127	4,632	8,988,808	9,000,035	5,603,327	14,603,362	2	450,881	14,152,481	2
491/493	Electric Utilities	122,158	17,131	2	3,209,870	3,349,160	732,953	4,082,113	3	9,154	4,072,959	3
--	Multiple codes 20–39***	25,777	10,403	2	146,150	182,332	3,075,342	3,257,675	4	207,753	3,049,921	4
28	Chemicals	14,654	7,087	129,843	749,680	901,263	1,110,408	2,011,671	5	586,165	1,425,507	5
32	Stone/Clay/Glass Products	41,707	388	1,098	333,323	376,516	680,067	1,056,583	6	13,272	1,043,311	6
12	Coal Mining	170	28	2,344	698,387	700,929	2,426	703,354	8	2	703,352	7
36	Electronic/Electrical Equipment	18,171	604	0	34,993	53,767	665,909	719,676	7	16,715	702,961	8
34	Fabricated Metals Products	19,880	799	0	18,676	39,354	311,659	351,013	9	42,389	308,623	9
26	Paper Products	16,518	14,066	50	122,231	152,865	87,275	240,140	10	1,589	238,551	10
30	Rubber and Plastics Products	12,361	138	0	27,879	40,378	153,844	194,221	11	7,447	186,774	11
39	Misc. Manufacturing Industries	877	31	0	25,001	25,908	105,516	131,424	13	937	130,487	12
37	Transportation Equipment	13,423	768	0	4,523	18,714	154,447	173,161	12	57,144	116,017	13
29	Petroleum and Coal Products	5,729	1,903	25	4,788	12,445	101,929	114,374	14	7,066	107,308	14
24	Lumber and Wood Products	9,291	101	0	19,837	29,228	12,787	42,015	15	1,092	40,924	15
35	Industrial Machinery	10,250	20	0	348	10,618	24,207	34,824	16	23	34,801	16
38	Measurement/Photographic Instruments	521	330	0	444	1,294	29,196	30,490	17	210	30,279	17
20	Food Products	7,173	278	0	2,488	9,938	15,857	25,795	18	238	25,557	18
5171	Petroleum Bulk Terminals	332	12	0	15,924	16,269	3,904	20,173	19	826	19,347	19
22	Textile Mill Products	1,677	7	0	1,254	2,939	11,158	14,097	20	0	14,097	20
25	Furniture and Fixtures	1,552	0	0	69	1,621	8,572	10,192	21	5,973	4,220	21
27	Printing and Publishing	247	0	0	58	305	3,992	4,297	22	286	4,011	22
21	Tobacco Products	41	9	0	0	50	2,838	2,888	23	0	2,888	23
5169	Chemical Wholesalers	9	4	0	0	13	1,993	2,006	24	246	1,760	24
31	Leather Products	0	0	0	0	0	57	57	25	0	57	25
23	Apparel and Other Textile Products	0	0	0	23	23	0	23	26	0	23	26
	Total	**960,623**	**67,179**	**139,038**	**23,644,857**	**24,811,698**	**23,542,903**	**48,354,601**		**5,038,351**	**43,316,249**	

Note: Canada and US data only. Mexico data not available for 2002.

* Off-site releases also reported as on-site releases by another NPRI or TRI facility. This amount is subtracted from total reported releases on- and off-site to get total releases (adjusted).

** Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

*** Multiple SIC codes reported only in TRI.

Releases On- and Off-site by Industry

Almost three-quarters of all North American releases were reported by two industries.

- The primary metals industry reported the largest releases of lead and its compounds, with 16.9 million kg, or 39 percent of the North American total. It reported the largest air emissions (66 percent of total air emissions), on-site land disposal (39 percent) and off-site releases (45 percent).
- Hazardous waste management facilities reported the second-largest releases, with 14.2 million kg (almost 33 percent of North American total releases).
- Electric utilities reported the third-largest amounts, with 4.1 million kg of releases of lead and its compounds for 2002. Electric utilities reported the largest surface water discharges with 17,000 kg, the second-largest air emissions with 122,000 kg and the third-largest on-site land disposal with 3.2 million kg of lead and its compounds for 2002.

Facilities with the Largest Releases, TRI and NPRI

A few facilities accounted for substantial amounts of the reported total releases as well as air and surface water releases of lead and its compounds in 2002. Air and water are generally considered to have greatest potential for near-term exposures of lead and its compounds.

- The facility with the largest total releases on- and off-site of lead and its compounds in 2002 was National Plastics Color Inc. in Valley Center, Kansas. This plastics and chemical manufacturer reported 2.6 million kg of lead and its compounds sent off-site for disposal.
- The facility with the second-largest total releases was Clean Harbors of Connecticut, Inc., in Bristol, Connecticut, with 2.5 million kg. This hazardous waste management facility reported most of its lead and lead compounds as on-site land disposal.
- The NPRI facility with the largest total releases on- and off-site of lead and its compounds in 2002 was the Clean Harbors Canada Inc., Lambton facility in Corunna, Ontario. This hazardous waste management facility reported 1.1 million kg as on-site land disposal.

Ten facilities in North America reported almost half (48 percent) of all on-site air emissions of lead and its compounds in 2002.

- The largest total on-site air releases of lead and its compounds in 2002 were reported by the Hudson Bay Mining and Smelting Company facility in Flin Flon, Manitoba. This primary metals facility reported almost 110,000 kg of air releases of lead and its compounds, 11 percent of the total air releases reported for 2002.
- The facility with the second-largest air releases was the Noranda Horne Smelter in Rouyn-Noranda, Quebec, with almost 104,000 kg.
- The TRI facility with the largest air releases was the Doe Run Herculaneum Smelter in Herculaneum, Missouri, with over 53,000 kg.

Table 10–4. Facilities in US and Canada with the Largest Total Reported Releases On- and Off-site of Lead and its Compounds, 2002

					On-site Releases						
North American Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total On-site and Off-site Releases Reported (kg)
	US										
1	National Plastics Color Inc.	Valley Center, KS		Mult.	0	0	0	0	0	2,594,882	2,594,882
2	Clean Harbors of Connecticut Inc., Clean Harbors Inc.	Bristol, CT		495/738	0	0	0	0	0	2,528,775	2,528,775
3	Sanders Lead Co. Inc.	Troy, AL		33	2,803	104	0	2,404,617	2,407,524	19	2,407,543
4	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	3,946	59	0	1,683,924	1,687,928	358	1,688,287
5	Doe Run Co. Recycling Facility, Renco Group Inc.	Boss, MO		33	14,073	14	0	0	14,087	1,584,162	1,598,249
	Canada										
10	Clean Harbors Canada Inc., Lambton Facility	Corunna, ON	49	495/738	3	0	0	1,098,000	1,098,003	0	1,098,003
21	Noranda Inc, Brunswick Smelter	Belledune, NB	29	33	8,550	107	0	0	8,657	470,566	479,223
27	IPSCO Saskatchewan Inc., Regina Plant Site, IPSCO Inc.	Regina, SK	29	33	3,191	0	0	0	3,191	326,769	329,960
46	Ispat Sidbec Inc., Aciérie, Ispat International Ltd.	Contrecœur, QC	29	33	830	106	0	152,270	153,206	0	153,206
55	Ispat Sidbec Inc., Sidbec-Feruni (Ispat) Inc. Contrecœur, Ispat International	Contrecœur, QC	29	33	0	0	0	0	0	120,150	120,150

Table 10–5. Facilities in Canada and US with the Largest Total On-site Air Releases of Lead and its Compounds, 2002

Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Total On-site Air Releases (kg)
1	Hudson Bay Mining and Smelting Company Ltd., Metallurgical Complex, Anglo American PLC	Flin Flon, MB	29	33	109,994
2	Noranda Inc, Fonderie Horne	Rouyn-Noranda, QC	29	33	103,616
3	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	29	33	77,283
4	Doe Run Co. Herculaneum Smelter, Renco Group Inc.	Herculaneum, MO		33	53,345
5	Falconbridge Ltd-Kidd Metallurgical Div., Kidd Metallurgical Site	Timmins/District of Cochrane, ON	29	33	40,949
6	Edison Mohave Generating Station, Edison Intl. Corp.	Laughlin, NV		491/493	24,996
7	Doe Run Co. Recycling Facility, Renco Group Inc.	Boss, MO		33	14,073
8	Doe Run Co. Glover Smelter, Renco Group Inc.	Glover, MO		33	13,716
9	ASARCO Inc. Amarillo Copper Refy., Americas Mining Corp.	Amarillo, TX		33	12,794
10	Noranda Inc., Fonderie Gaspé	Murdochville, QC	29	33	10,100
	Subtotal				**460,866**
	% of Total				**48**
	Total				**960,623**

Table 10–6. Facilities in Canada and US with the Largest Total On-site Surface Water Discharges of Lead and its Compounds, 2002

Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Total On-site Surface Water Discharges (kg)
1	Kennedy Valve, McWane Inc.	Elmira, NY		Mult.	6,803
2	PCS Nitrogen Fertilizer L.P.	Geismar, LA		28	4,926
3	Dunkirk Steam Station, NRG Energy Inc.	Dunkirk, NY		491/493	3,311
4	Huntley Generating Station, NRG Energy Inc.	Tonawanda, NY		491/493	2,358
5	Teck Cominco Metals Ltd., Trail Operations	Trail, BC	29	33	1,920
6	Cooper Power Station, East Kentucky Power Co-Op Inc.	Burnside, KY		491/493	1,254
7	Joliet Generating Station (#9 & #29), Edison Intl.	Joliet, IL		491/493	1,117
8	USS Gary Works, US Steel Corp.	Gary, IN		33	1,111
9	Valley Power Plant, Wisconsin Energy Corp.	Milwaukee, WI		491/493	1,047
10	Republic Engineered Prods. L.L.C., Lorain Plant	Lorain, OH		491/493	948
	Subtotal				**24,795**
	% of Total				**37**
	Total				**67,179**

Table 10–7. Total Reported Amounts of Releases and Transfers of Lead and its Compounds in North America, by State/Province, 2002

State/Province	Number of Facilities	Total Reported Releases On- and Off-site		Transfers Off-site to Recycling		Total Reported Amounts of Releases and Transfers	
		kg	Rank	kg	Rank	kg	Rank
Alabama	217	3,753,891	1	1,101,220	27	4,855,111	14
Alaska	7	1,188	60	0	61	1,188	60
Alberta	36	348,774	33	41,509	46	390,283	42
Arizona	101	2,221,440	9	949,221	30	3,170,661	20
Arkansas	117	392,099	27	2,000,775	23	2,392,874	27
British Columbia	40	173,959	41	24,051,186	1	24,225,146	1
California	542	2,137,257	10	6,008,480	9	8,145,737	9
Colorado	94	112,844	45	1,729,710	24	1,842,554	29
Connecticut	147	2,574,802	8	361,493	34	2,936,295	22
Delaware	20	38,902	49	2,279,190	20	2,318,092	28
District of Columbia	1	127	63	0	63	127	63
Florida	235	376,076	30	3,133,139	17	3,509,215	19
Georgia	210	293,387	36	3,568,341	16	3,861,728	18
Guam	4	51	64	0	64	51	64
Hawaii	14	3,889	59	8	59	3,896	59
Idaho	35	1,127,245	14	191,080	39	1,318,325	33
Illinois	427	1,878,943	12	4,611,542	12	6,490,485	12
Indiana	394	2,903,633	4	12,380,136	4	15,283,769	4
Iowa	120	501,496	23	6,334,258	7	6,835,754	10
Kansas	92	2,689,759	5	6,985,045	6	9,674,804	6
Kentucky	180	365,990	31	2,616,719	19	2,982,709	21
Louisiana	112	520,992	22	3,812,633	15	4,333,625	16
Maine	41	12,226	53	10,878	51	23,104	57
Manitoba	9	195,333	38	48,600	44	243,933	47
Maryland	63	100,061	46	19,660	50	119,721	51
Massachusetts	236	166,587	42	129,103	42	295,691	46
Michigan	335	545,545	21	991,206	29	1,536,751	31
Minnesota	155	317,846	35	2,129,519	21	2,447,365	26
Mississippi	126	188,472	39	1,415,062	26	1,603,534	30
Missouri	197	3,675,049	2	6,177,445	8	9,852,493	5
Montana	18	34,509	50	345	56	34,853	56
Nebraska	61	1,072,066	15	131,198	41	1,203,264	36
Nevada	30	1,202,611	13	204,320	38	1,406,931	32
New Brunswick	13	486,740	24	603	55	487,342	40
New Hampshire	65	28,977	51	137,731	40	166,708	48
New Jersey	168	471,105	25	809,543	31	1,280,648	35
New Mexico	26	121,430	44	7,598	52	129,028	50
New York	287	381,133	29	16,882,974	2	17,264,107	2
Newfoundland and Labrador	2	177	62	0	62	177	62
North Carolina	293	391,681	28	8,582,821	5	8,974,501	7
North Dakota	18	135,049	43	3,463	54	138,512	49
Northern Marianas	3	2	65	0	65	2	65
Nova Scotia	9	21,150	52	278,256	37	299,406	45
Ohio	588	3,624,234	3	5,050,639	10	8,674,873	8
Oklahoma	96	185,787	40	1,096,418	28	1,282,205	34
Ontario	238	1,976,228	11	4,665,076	11	6,641,304	11
Oregon	108	678,065	18	2,009,151	22	2,687,216	24
Pennsylvania	490	2,660,030	7	3,050,680	18	5,710,709	13
Prince Edward Island	2	5,863	58	84	57	5,947	58
Puerto Rico	35	11,371	54	24,581	48	35,952	55
Quebec	89	576,272	20	3,817,788	14	4,394,060	15
Rhode Island	54	7,087	57	37,997	47	45,084	54
Saskatchewan	5	354,249	32	6,002	53	360,251	43
South Carolina	169	448,692	26	626,064	32	1,074,756	37
South Dakota	29	10,478	55	61,348	43	71,825	53
Tennessee	210	676,804	19	15,340,888	3	16,017,692	3
Texas	423	1,002,636	16	1,615,640	25	2,618,275	25
Utah	63	2,669,416	6	47,902	45	2,717,319	23
Vermont	17	7,557	56	305,288	35	312,846	44
Virgin Islands	3	614	61	46	58	660	61
Virginia	189	333,676	34	565,522	33	899,198	38
Washington	140	96,031	47	299,230	36	395,260	41
West Virginia	106	741,918	17	24,453	49	766,371	39
Wisconsin	326	248,050	37	4,041,446	13	4,289,496	17
Wyoming	23	75,054	48	6	60	75,060	52
Total	**8,703**	**48,354,601**		**162,802,260**		**211,156,860**	

Note: Canada and US data only. Mexico data not available for 2002. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings are meant to imply that a facility, state or province is not meeting its legal requirements. The data do not predict levels of exposure of the public to those chemicals.

Ten facilities in North America reported more than one-third (37 percent) of all on-site surface water discharges of lead and its compounds in 2002.

- The largest total on-site surface water discharges of lead and its compounds in 2002 were reported by the Kennedy Valve, McWane Inc., facility in Elmira, New York, with 6,803 kg. It indicated operations in both the fabricated metals and primary metals industry sectors.
- The facility with the second-largest surface water releases was the chemical manufacturer PCS Nitrogen Fertilizer in Geismar, Louisiana, with 4,926 kg.

Total Releases and Transfers, 2002

Data in this section include releases on- and off-site as well as lead and its compounds transferred to other facilities for recycling.

Total Releases and Transfers by State/Province

More than one-third of all North American releases and transfers of lead and its compounds originated in four states and provinces.

- British Columbia reported the largest releases and transfers of lead and its compounds, with 24.2 million kg, or 11 percent of the North American total. It reported the largest off-site transfers to recycling, mainly from one facility, K.C. Recycling, in Trail, which reported transfers of 24.0 million kg.
- New York reported the second-largest releases and transfers with 17.3 million kg (over 8 percent of the North American total) and the second-largest transfers to recycling. One facility, Revere Smelting and Refining, in Middletown, reported 15.4 million kg of transfers.
- Tennessee and Indiana followed with more than 15 million kg each, mainly as transfers to recycling. One Tennessee facility, Exide Techs, in Bristol, reported 14.4 million kg in transfers.

Total Releases and Transfers by Industry

More than two-thirds of all North American releases and transfers of lead and its compounds were from facilities in two industry sectors.

- The electronic/electrical equipment manufacturers reported the largest releases and transfers of lead and its compounds, with 89.8 million kg, or 43 percent of the North American total. Almost the entire total was as off-site transfers to recycling. This industry reported 55 percent of all off-site transfers to recycling for 2002.
- Primary metals facilities reported the second-largest releases and transfers, with 52.7 million kg (25 percent of the North American total) and the second-largest transfers to recycling. This sector also accounted for 42 percent of the reported releases on- and off-site.
- The miscellaneous manufacturing industry (industries not otherwise classified in other SIC codes) followed with 24.9 million kg, mainly as transfers to recycling, led by the K.C. Recycling facility (Trail, BC) mentioned above.
- Hazardous waste management facilities reported the fourth-largest total releases and transfers, 15.2 million kg, mainly as releases on- and off-site.

Table 10–8. Total Reported Amounts of Releases and Transfers of Lead and its Compounds in North America, by Industry, 2002

		Total Reported Releases On- and Off-site		Transfers Off-site to Recycling		Total Reported Amounts of Releases and Transfers	
US SIC Code	Industry	kg	Rank	kg	Rank	kg	Rank
36	Electronic/Electrical Equipment	719,676	7	89,062,768	1	89,782,444	1
33	Primary Metals	20,528,977	1	32,163,622	2	52,692,598	2
39	Misc. Manufacturing Industries	131,424	13	24,766,001	3	24,897,425	3
495/738	Hazardous Waste Mgt./Solvent Recovery	14,603,362	2	642,332	9	15,245,694	4
--	Multiple codes 20–39*	3,257,675	4	4,116,646	5	7,374,321	5
34	Fabricated Metals Products	351,013	9	4,865,299	4	5,216,312	6
28	Chemicals	2,011,671	5	2,816,948	6	4,828,619	7
491/493	Electric Utilities	4,082,113	3	253,453	11	4,335,566	8
37	Transportation Equipment	173,161	12	1,749,918	7	1,923,079	9
35	Industrial Machinery	34,824	16	1,431,461	8	1,466,285	10
32	Stone/Clay/Glass Products	1,056,583	6	298,478	10	1,355,062	11
12	Coal Mining	703,354	8	0	--	703,354	12
30	Rubber and Plastics Products	194,221	11	223,222	12	417,444	13
26	Paper Products	240,140	10	10,474	18	250,615	14
38	Measurement/Photographic Instruments	30,490	17	219,003	13	249,493	15
29	Petroleum and Coal Products	114,374	14	68,599	15	182,973	16
27	Printing and Publishing	4,297	22	71,021	14	75,318	17
24	Lumber and Wood Products	42,015	15	17,706	16	59,722	18
20	Food Products	25,795	18	6,928	19	32,723	19
25	Furniture and Fixtures	10,192	21	12,870	17	23,062	20
5171	Petroleum Bulk Terminals	20,173	19	317	22	20,490	21
22	Textile Mill Products	14,097	20	3,637	20	17,733	22
5169	Chemical Wholesalers	2,006	24	1,556	21	3,561	23
21	Tobacco Products	2,888	23	0	--	2,888	24
31	Leather Products	57	25	0	--	57	25
23	Apparel and Other Textile Products	23	26	0	--	23	26
	Total	**48,354,601**		**162,802,260**		**211,156,860**	

Note: Canada and US data only. Mexico data not available for 2002.
* Multiple SIC codes reported only in TRI.

Table 10–9. Facilities in US and Canada with the Largest Total Reported Amounts of Releases and Transfers of Lead and its Compounds, 2002

North American Rank	Country Rank	Facility	City, State/ Province	SIC Codes Canada	SIC Codes US	Country Rank	Total On-site and Off-site Releases Reported (kg)	Transfers Off-site to Recycling (kg)	Total Reported Amounts of Releases and Transfers (kg)
		US							
2	1	Revere Smelting & Refining Corp., Eco-Bat New York L.L.C.	Middletown, NY		33	1	16,209	15,366,622	15,382,831
3	2	Exide Techs.	Bristol, TN		36	2	3,640	14,415,830	14,419,470
4	3	Johnson Controls, Fort Wayne Distribution Center	Fort Wayne, IN		36	3	0	8,979,129	8,979,130
5	4	Exide Techs.	Manchester, IA		36	4	1,489	5,626,976	5,628,465
6	5	Exide Corp.	Salina, KS		36	5	1,112	5,020,661	5,021,773
		Canada							
1	1	K.C. Recycling Ltd.	Trail, BC	39	39	1	25	24,000,000	24,000,025
19	2	Delphi Canada Inc., Oshawa Battery Plant	Oshawa, ON	33	36	2	52,504	1,700,256	1,752,760
24	3	Fonderie Générale du Canada, Noranda Inc.	Lachine, QC	35	28	3	0	1,564,000	1,564,000
34	4	Falconbridge Ltd-Kidd Metallurgical Div., Kidd Metallurgical Site	Timmins/District of Cochrane, ON	29	33	4	40,977	1,079,858	1,120,835
37	5	Clean Harbors Canada Inc., Lambton Facility	Corunna, ON	49	495/738	5	1,098,003	0	1,098,003

Facilities with Largest Total Releases and Transfers, 2002

- The largest total releases and transfers of lead and its compounds in 2002 were reported by the miscellaneous manufacturing facility, K.C. Recycling Ltd. (Trail, BC). This facility produces and processes non-ferrous metal and reported 24.0 million kg sent off-site for recycling.
- The facility with the second-largest total releases and transfers was the Revere Smelting & Refining Corp. in Middletown, New York, with 15.4 million kg, also mostly transferred off-site for recycling.
- The electronic/electrical equipment manufacturer of storage batteries, Exide Techs. facility in Bristol, Tennessee, reported 14.4 million kg transferred off-site for recycling.

Largest Total Off-site Transfers to Recycling, Sending and Receiving Facilities, 2002

Transfers of lead and its compounds for recycling accounted for 77 percent of total releases and transfers in 2002. The electronic/electrical equipment manufacturing sector reported the largest portion, with 55 percent of all transfers to recycling from this sector and only 1 percent of the total releases in 2002. Eight parent companies, owning facilities in this sector accounted for 91 percent of the transfers to recycling from this sector. These transfers went to a relatively few sites for recycling. Just 22 sites accounted for 89 percent of all transfers for recycling in 2002.

Off-site Transfers to Recycling by the Electronic/Electrical Equipment Sector

The electronic/electrical equipment sector (US SIC 36) reported the largest amount of transfers to recycling of lead and its compounds in 2002. Eight parent companies, owning facilities in this sector, reported more than one million kg of lead and lead compounds in 2002.

- The parent company with the largest total off-site transfers of lead and its compounds from facilities in the electronic/electrical equipment sector was the Exide Corporation. This company had 10 facilities, all located in the US, which reported a total of 32.7 million kg transferred for recycling.
- Thirteen US electronic/electrical equipment manufacturing facilities owned by Johnson Controls reported a total of 29.5 million kg transferred for recycling in 2002.
- One of the eight parent companies with the largest transfers to recycling of lead and its compounds in 2002 had facilities in the United States as well as in Canada. The Delphi Corporation had nine facilities and its Canadian facility in Oshawa, Ontario, reported 1.8 million kg transferred—almost all such transfers reported by this company for 2002.

Table 10–10. Parent Companies of Facilities in Electronic/Electrical Equipment Manufacturing Sector (US SIC 36) with Largest Transfers to Recycling of Lead and its Compounds, 2002

Facility's North American Rank Within US SIC Code 36	Parent Company/Facility Name	Facility Location	Total Transfers to Recycling (kg)	Total Reported Amounts of Releases and Transfers (kg)
	Exide Corp.		**32,722,387**	**32,739,650**
1	Exide Techs.	Bristol, TN	14,415,830	14,419,470
3	Exide Techs.	Manchester, IA	5,626,976	5,628,465
4	Exide Corp.	Salina, KS	5,020,661	5,021,773
7	Exide Techs.	Shreveport, LA	3,664,715	3,667,027
20	Exide Techs.	Florence, MS	1,151,429	1,153,306
22	Exide Corp.	Fort Smith, AR	947,412	952,866
25	Exide Techs. dba GNB Indl. Power	Kankakee, IL	906,809	907,467
32	Exide Techs.	City of Industry, CA	504,252	504,556
36	Exide Techs.	Kansas City, KS	484,304	484,717
1069	Exide Corp., Reading SLI	Laureldale, PA	0	2
	Johnson Controls Inc.		**29,501,216**	**29,503,531**
2	Johnson Controls Fort Wayne Distribution Center	Fort Wayne, IN	8,979,129	8,979,130
6	Johnson Controls Battery Group Inc.	Saint Joseph, MO	3,692,676	3,692,829
8	Johnson Controls Battery Group Inc.	Tampa, FL	2,856,781	2,856,920
9	Johnson Controls Inc. Battery Group	Holland, OH	2,719,480	2,719,564
10	Johnson Controls Battery Group Inc.	Kernersville, NC	2,709,982	2,711,061
12	Johnson Controls Battery Group Inc.	Middletown, DE	2,066,892	2,067,046
13	Johnson Controls Battery Group Inc.	Canby, OR	1,904,183	1,904,242
16	Johnson Control Battery Group Inc., Geneva	Geneva, IL	1,449,103	1,449,307
17	Optima Batteries Inc.	Aurora, CO	1,405,896	1,406,308
27	Johnson Controls Battery Group	Fullerton, CA	679,358	679,384
29	Johnson Controls Battery Group Inc.	Milwaukee, WI	661,955	661,956
43	Johnson Controls Distribution Center	Saint Joseph, MO	291,221	291,222
59	Johnson Controls Battery Group Inc.	Florence, KY	84,560	84,563
	Douglas Battery Mfg. Co.		**4,938,752**	**4,939,512**
5	Douglas Battery Mfg. Co.	Winston-Salem, NC	4,938,752	4,939,512
	C & D Techs. Inc.		**4,168,386**	**4,172,197**
11	C & D Techs., Dynasty Div.	Milwaukee, WI	2,204,319	2,204,906
24	C & D Techs.	Attica, IN	941,757	943,518
28	C & D Techs. Inc.	Huguenot, NY	668,760	670,162
41	C & D Techs. Inc.	Conyers, GA	353,551	353,601
927	AWI/CDT	Fort Lauderdale, FL	0	10
	Enersys Inc.		**3,808,085**	**3,809,313**
15	Enersys Inc. Battery Plant	Richmond, KY	1,612,949	1,613,752
18	Enersys Inc.	Hays, KS	1,318,439	1,318,859
26	Hawker Energy Prods. Inc.	Warrensburg, MO	876,698	876,702
	Trojan Battery Co.		**2,463,220**	**2,539,343**
19	Trojan Battery Co.	Santa Fe Springs, CA	1,215,193	1,217,004
21	Trojan Battery Co.	Lithonia, GA	1,047,075	1,117,919
48	Trojan Battery Co.	Santa Fe Springs, CA	200,952	204,420
	Delphi Corp.		**1,940,640**	**1,997,778**
14	Delphi Canada Inc., Oshawa Battery Plant	Oshawa, ON	1,700,256	1,752,760
50	Delphi Energy & Chassis Sys. - Indianapolis	Indianapolis, IN	153,829	153,903
75	Delphi Delco Electronics Sys., Milwaukee	Oak Creek, WI	24,050	24,124
77	Delphi Energy & Chassis Sys. - Olathe, KS	Olathe, KS	22,946	23,402
81	Delphi Energy & Chassis Sys., Fitzgerald	Fitzgerald, GA	18,535	19,517
89	Delphi Energy & Chassis Sys., Anaheim	Anaheim, CA	12,054	13,632
114	Delphi Energy & Chassis Sys., New Brunswick	New Brunswick, NJ	6,281	7,563
173	Delphi Packard Electric Sys.	Foley, AL	2,690	2,825
956	Delphi Energy & Chassis Sys.	Anderson, IN	0	52
	Palos Verdes Building Corp.		**1,112,296**	**1,112,325**
30	US Battery Mfg. Co.	Corona, CA	613,429	613,434
34	US Battery Mfg. Co.	Augusta, GA	498,866	498,887
907	US Battery Mfg. Co.	Evans, GA	0	5
	Subtotal for Top 8 Parent Companies		**80,654,982**	**80,813,650**
	% of Total		**91**	**90**
	Total for All Facilities in US SIC 36		**89,062,768**	**89,782,444**

Table 10–11. Transfers Sites Receiving Largest Amounts of Lead and its Compounds for Recycling, NPRI and TRI, 2002

Transfer Receiving Site	City	State/Province	Transfers to Recycling NPRI (kg)	TRI (kg)	Total (kg)
Cominco Ltd.	Trail	BC	24,012,430	0	24,012,430
Doe Run Buick Recycling Center	Boss	MO	6,800	23,017,790	23,024,590
Quemetco Inc.	Indianapolis	IN	0	16,935,695	16,935,695
Quemetco Inc	City of Industry	CA	0	13,084,214	13,084,214
Exide Corp., Reading Smelter Div.	Reading	PA	0	10,745,837	10,745,837
Exide Corp.	Muncie	IN	0	8,324,007	8,324,007
Exide Corporation, Canon Hollow Plant	Forest City	MO	0	7,724,342	7,724,342
Sanders Lead Co. Inc.	Trov	AL	0	6,240,226	6,240,226
Exide Corp.	Frisco	TX	0	5,428,734	5,428,734
Gulf Coast Recycling Inc.	Tampa	FL	0	4,058,360	4,058,360
Gopher Resource Corp	Eagan	MN	0	3,992,394	3,992,394
Revere Smelting & Refining	Middletown	NY	181,610	3,117,844	3,299,454
Noranda Inc.- Brunswick Smelting	Belledune	NB	3,027,683	0	3,027,683
Zinc Nacional S.A	Monterrey, Nuevo León, Mexico		0	2,319,436	2,319,436
Nova Pb	Sainte Catherine	QC	561,765	1,620,157	2,181,922
Tonolli Canada Ltd.	Mississauga	ON	1,911,118	0	1,911,118
Horsehead Resource Development	Palmerton	PA	353,542	1,390,462	1,744,004
Exide Corporation, Schulkill Metals Division	Baton Rouge	LA	0	1,650,749	1,650,749
Dlubak Glass Co.	Upper Sandusky	OH	0	1,586,218	1,586,218
Horsehead Development Co.	Chicago	IL	0	1,301,496	1,301,496
Alfa-Fry Group (Cooksen Electronics)	Altoona	PA	39,940	1,136,318	1,176,258
Fonderie Générale du Canada - Noranda	Lachine	QC	1,019,511	94,331	1,113,842
Subtotal			**31,114,399**	**113,768,453**	**144,882,852**
% of Total			**95**	**88**	**89**
Total			**32,909,104**	**129,893,155**	**162,802,260**

Note: Data on transfers from Mexican facilities not available for 2002.

Transfers Sites Receiving Largest Transfers for Recycling

Twenty-two sites in North America received more than one million kg of lead and lead compounds in 2002 for recycling. They included sites in the United States, Canada and Mexico and accounted for 89 percent of all transfers for recycling in 2002.

- The Cominco Ltd. facility in Trail, British Columbia, received 24.0 million kg of lead and its compounds from NPRI facilities in 2002.
- The Doe Run Buick Recycling Center in Boss, Missouri, received 23.0 million kg, most of which was from TRI facilities.
- One site, Nova Pb in Sainte Catherine, Quebec, received transfers from both NPRI and TRI facilities. Over 1.6 million kg were from across the border from US facilities and almost 562,000 kg were from NPRI facilities.
- One site in Mexico, Zinc Nacional S.A. in Monterrey, Nuevo León, received transfers of 2.3 million kg from TRI facilities. Data on transfers from Mexican facilities was not available for 2002.

Releases and Transfers of Lead and its Compounds for Industries not in Matched Data Set, 2002

Not all industry sectors are required to report to TRI and some sectors reporting requirements differ so they are not included in the *Taking Stock* matched data set.

- An additional 414,000 kg of lead and its compounds were reported by NPRI facilities not in the matched industry set. Incinerators and waste-to-energy facilities accounted for more than one-third (156,000 kg) of the additional amount. Department of Defence facilities (for example, rifle training ranges) reported an additional 105,000 kg (25 percent of the total from the industries not in the matched data set) and municipal sewage and water systems reported 92,000 kg (22 percent).
- For TRI, the Department of Defense facilities reported 2.2 million kg and other federal agencies reported 1.6 million kg.
- Metal mining facilities report to both NPRI and TRI, but the requirements on reporting on substances in waste piles differ so amounts from these facilities do not compare.

Table 10–12. Releases and Transfers of Lead and its Compounds for Industries not in Matched Data Set, NPRI and TRI, 2002

Industry	Number of Forms	On-site Releases (kg)	Off-site Releases (kg)	Total Releases On- and Off-site (kg)	Transfers to Recycling (kg)	Total Reported Releases and Transfers (kg)
NPRI						
Municipal Incinerator, Waste to Energy Facilities	2	59	156,280	156,339	0	156,339
Department of National Defence	26	101,825	1,004	102,830	2,552	105,382
Municipal Sewage and Water Systems	71	19,150	71,984	91,134	1,145	92,279
Other	22	32,137	268	32,405	4,174	36,579
Subtotal	**121**	**153,172**	**229,536**	**382,708**	**7,871**	**390,579**
Metal Mining (does not include waste rock)	23	20,740	0	20,740	2,500	23,240
Total for Industries not in Matched Data Set	**144**	**173,912**	**229,536**	**403,448**	**10,371**	**413,819**
TRI						
Department of Defense	132	1,066,646	22,796	1,089,442	30,496	2,209,379
Other Federal Departments	42	521,029	244,461	765,490	52,523	1,583,502
Other	35	2,911	3,356	6,267	576,807	589,341
Subtotal	**209**	**1,590,586**	**270,613**	**1,861,199**	**659,825**	**4,382,223**
Metal Mining (includes waste rock)	63	158,059,087	3,414	158,062,501	520,064	316,645,065
Total for Industries not in Matched Data Set	**272**	**159,649,672**	**274,027**	**159,923,699**	**1,179,889**	**321,027,288**

Table 10–13. New Facilities Reporting under Lowered Threshold for Lead and its Compounds, 2002

	NPRI					TRI				
	Facilities Reporting for 2000 and 2002		"New" Facilities: Reporting for 2002 and not 2000		All Facilities Reporting	Facilities Reporting for 2000 and 2002		"New" Facilities: Reporting for 2002 and not 2000		All Facilities Reporting
	Number	Percent of All Facilities	Number	Percent of All Facilities	Number	Number	Percent of All Facilities	Number	Percent of All Facilities	Number
Total Facilities	148	33	295	67	443	1,690	20	6,570	80	8,260
Releases On- and Off-site	**kg**	**%**	**kg**	**%**	**kg**	**kg**	**%**	**kg**	**%**	**kg**
On-site Releases	**1,958,080**	**97**	**57,714**	**3**	**2,015,794**	**19,926,882**	**87**	**2,869,022**	**13**	**22,795,903**
Air	375,065	93	26,481	7	401,546	341,998	61	217,079	39	559,077
Surface Water	4,311	57	3,285	43	7,595	20,431	34	39,152	66	59,583
Underground Injection	23	--	51	--	74	135,367	97	3,598	3	138,964
Land	1,578,681	98	27,897	2	1,606,578	19,429,085	88	2,609,193	12	22,038,279
Off-site Releases (Transfers of Metals)*	**1,949,127**	**92**	**173,822**	**8**	**2,122,949**	**15,720,431**	**73**	**5,699,522**	**27**	**21,419,953**
Total Reported Releases On- and Off-site	**3,907,207**	**94**	**231,536**	**6**	**4,138,744**	**35,647,313**	**81**	**8,568,544**	**19**	**44,215,857**
Off-site Transfers to Recycling	**8,483,583**	**26**	**24,425,521**	**74**	**32,909,104**	**115,253,690**	**89**	**14,639,466**	**11**	**129,893,155**
Total Reported Amounts of Releases and Transfers	**12,390,791**	**33**	**24,657,057**	**67**	**37,047,848**	**150,901,002**	**87**	**23,208,010**	**13**	**174,109,012**

* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

Releases and Transfers of Lead and its Compounds from Facilities Newly Reporting for 2002

The amounts of lead and its compounds reported in 2001 and prior years do not compare to those reported in 2002 because of a difference in reporting thresholds between NPRI and TRI and with previous years.

- For 2002, there were 295 NPRI facilities and 6,570 TRI facilities in the matched industries that reported on lead and its compounds and that had not reported for 2000. These "newly" reporting facilities represented two-thirds of all NPRI facilities reporting on lead and its compounds in 2002 and 80 percent of all TRI facilities.
- NPRI facilities newly reporting represented 67 percent of all NPRI facilities reporting on lead and its compounds but accounted for just 6 percent of total releases in 2002.
- One NPRI facility (K.C. Recycling in Trail, British Columbia) reporting on lead and its compounds for 2002 (that did not report for it in 2000) accounted for 24.0 million kg of off-site transfers to recycling, or 65 percent of total reported releases and transfers of lead and its compounds from all NPRI facilities in 2002.
- TRI facilities in the matched industries newly reporting on lead and its compounds accounted for 19 percent of total releases but represented 80 percent of all facilities.

Releases and Transfers of Lead and its Compounds, 1998–2000

The threshold for reporting lead and its compounds changed for 2001 in TRI and for 2002 in NPRI. Therefore, amounts reported for 2001 and prior years do not compare with those reported for 2002.

- For 1998–2000, under the higher threshold, total releases and transfers of lead and its compounds from industries in the matched data set decreased by 19 percent. This included a 19-percent reduction in off-site transfers to recycling and a 22-percent reduction in releases on- and off-site.
- NPRI facilities reported a decrease of 8 percent in total releases and transfers, including a 14-percent decrease in transfers to recycling and a 4-percent reduction in releases on- and off-site. On-site releases increased by 165 percent, due to a more than doubling of on-site land disposal.
- TRI facilities reported a decrease of 20 percent in total releases and transfers, with a 20-percent decrease in transfers to recycling and a 25-percent decrease in total releases and in on-site releases.

Table 10–14. Total Reported Amounts of Releases and Transfers in North America for Lead and its Compounds, 1998–2000

	North America				
	1998	1999	2000	Change 1998–2000	
	Number	Number	Number	Number	%
Total Facilities	2,086	2,023	2,116	30	1
Total Forms	2,118	2,046	2,145	27	1
	kg	kg	kg	kg	%
On-site Releases*	**26,436,471**	**24,405,722**	**22,525,139**	**-3,911,332**	**-15**
Air	1,140,831	1,069,012	1,070,369	-70,462	-6
Surface Water	66,750	38,635	44,686	-22,064	-33
Underground Injection	92,714	88,982	123,740	31,026	33
Land	25,131,172	23,205,300	21,282,565	-3,848,608	-15
Off-site Releases (Transfers of Metals)**	**24,299,542**	**34,511,897**	**18,723,550**	**-5,575,992**	**-23**
Total Reported Releases On- and Off-site	**50,736,013**	**58,917,619**	**41,214,689**	**-9,521,323**	**-19**
Off-site Releases Omitted for Adjustment Analysis***	7,239,886	8,641,010	7,397,291	157,405	--
Total Reported Releases On- and Off-site (adjusted)****	**43,496,127**	**50,276,609**	**33,817,399**	**-9,678,728**	**-22**
Off-site Transfers to Recycling	**165,761,268**	**150,883,181**	**134,151,424**	**-31,609,844**	**-19**
Total Reported Amounts of Releases and Transfers	**216,497,281**	**209,800,800**	**175,400,114**	**-41,097,167**	**-19**

	NPRI					TRI				
	1998	1999	2000	Change 1998–2000		1998	1999	2000	Change 1998–2000	
	Number	Number	Number	Number	%	Number	Number	Number	Number	%
Total Facilities	163	163	168	5	3	1,923	1,860	1,948	25	1
Total Forms	163	163	169	6	4	1,955	1,883	1,976	21	1
	kg	kg	kg	kg	%	kg	kg	kg	kg	%
On-site Releases*	**1,375,196**	**3,398,746**	**3,647,203**	**2,272,007**	**165**	**25,061,275**	**21,006,976**	**18,877,936**	**-6,183,339**	**-25**
Air	531,381	472,167	474,990	-56,391	-11	609,450	596,845	595,379	-14,071	-2
Surface Water	13,304	9,584	5,208	-8,096	-61	53,446	29,051	39,478	-13,968	-26
Underground Injection	40	39	3	-37	-93	92,674	88,943	123,737	31,063	34
Land	825,468	2,913,163	3,163,223	2,337,755	283	24,305,704	20,292,137	18,119,342	-6,186,363	-25
Off-site Releases (Transfers of Metals)**	**3,473,335**	**15,483,724**	**1,767,303**	**-1,706,032**	**-49**	**20,826,207**	**19,028,173**	**16,956,247**	**-3,869,960**	**-19**
Total Reported Releases On- and Off-site	**4,848,531**	**18,882,470**	**5,380,506**	**531,975**	**11**	**45,887,482**	**40,035,149**	**35,834,183**	**-10,053,298**	**-22**
Off-site Releases Omitted for Adjustment Analysis***	55,882	2,287,228	782,480	726,598	--	7,184,004	6,353,782	6,614,811	-569,193	--
Total Reported Releases On- and Off-site (adjusted)****	**4,792,649**	**16,595,242**	**4,598,026**	**-194,623**	**-4**	**38,703,478**	**33,681,367**	**29,219,373**	**-9,484,105**	**-25**
Off-site Transfers to Recycling	**15,357,943**	**12,749,289**	**13,196,404**	**-2,161,539**	**-14**	**150,403,325**	**138,133,892**	**120,955,020**	**-29,448,305**	**-20**
Total Reported Amounts of Releases and Transfers	**20,206,474**	**31,631,759**	**18,610,910**	**-1,595,564**	**-8**	**196,290,807**	**178,169,041**	**156,789,204**	**-39,501,603**	**-20**

Note: Canada and US data only. Mexico data not available for 2002. Data are from NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data, in combination with other information, can be used as a starting point in evaluating exposures that may result from releases and other management activities which involve these chemicals.

* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

** Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

*** Off-site releases also reported as on-site releases by another NPRI or TRI facility. This amount is subtracted from total reported releases on- and off-site to get total releases on- and off-site (adjusted).

**** Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

Table 10–15. Total Releases On- and Off-site in North America for Lead and its Compounds, for Manufacturing Industries, 1995–2000

	North America							
	1995	1996	1997	1998	1999	2000	Change 1995–2000	
	Number	Number	Number	Number	Number	Number	Number	%
Total Facilities	1,818	1,819	1,800	1,822	1,782	1,869	51	3
Total Forms	1,848	1,851	1,824	1,849	1,803	1,894	46	2
	kg	kg	kg	kg	kg	kg	kg	%
On-site Releases*	**9,204,336**	**9,136,784**	**10,720,171**	**10,740,321**	**9,516,509**	**7,501,630**	**-1,702,706**	**-18**
Air	1,380,659	1,326,729	1,113,321	1,058,928	993,938	1,000,328	-380,331	-28
Surface Water	47,857	35,500	28,863	36,464	27,330	28,433	-19,424	-41
Underground Injection	83,447	302,899	119,762	81,796	82,973	97,652	14,206	17
Land	7,686,880	7,466,107	9,452,864	9,558,130	8,408,475	6,371,437	-1,315,443	-17
Off-site Releases (Transfers of Metals)**	**14,412,037**	**14,869,914**	**21,324,010**	**18,864,478**	**16,804,878**	**15,929,810**	**1,517,774**	**11**
Total Releases On- and Off-site	**23,616,373**	**24,006,698**	**32,044,181**	**29,604,800**	**26,321,386**	**23,431,440**	**-184,932**	**-1**

	NPRI							
	1995	1996	1997	1998	1999	2000	Change 1995–2000	
	Number	Number	Number	Number	Number	Number	Number	%
Total Facilities	135	132	131	144	145	148	13	10
Total Forms	135	132	131	144	145	148	13	10
	kg	kg	kg	kg	kg	kg	kg	%
On-site Releases*	**1,727,819**	**1,397,704**	**1,252,713**	**1,191,377**	**1,016,424**	**839,360**	**-888,459**	**-51**
Air	529,737	565,293	547,917	530,871	471,682	474,414	-55,323	-10
Surface Water	18,505	6,124	5,371	13,234	9,475	5,126	-13,379	-72
Underground Injection	40	45	43	40	39	3	-37	-93
Land	1,174,044	820,693	694,021	642,229	531,435	356,038	-818,006	-70
Off-site Releases (Transfers of Metals)**	**2,396,677**	**2,656,809**	**3,297,710**	**2,520,082**	**1,838,356**	**1,380,631**	**-1,016,046**	**-42**
Total Releases On- and Off-site	**4,124,496**	**4,054,513**	**4,550,423**	**3,711,459**	**2,854,780**	**2,219,991**	**-1,904,505**	**-46**

	TRI							
	1995	1996	1997	1998	1999	2000	Change 1995–2000	
	Number	Number	Number	Number	Number	Number	Number	%
Total Facilities	1,683	1,687	1,669	1,678	1,637	1,721	38	2
Total Forms	1,713	1,719	1,693	1,705	1,658	1,746	33	2
	kg	kg	kg	kg	kg	kg	kg	%
On-site Releases*	**7,476,517**	**7,739,080**	**9,467,458**	**9,548,944**	**8,500,085**	**6,662,270**	**-814,247**	**-11**
Air	850,922	761,436	565,404	528,057	522,256	525,914	-325,008	-38
Surface Water	29,352	29,376	23,492	23,230	17,855	23,307	-6,045	-21
Underground Injection	83,407	302,854	119,719	81,756	82,934	97,649	14,243	17
Land	6,512,836	6,645,414	8,758,843	8,915,901	7,877,040	6,015,399	-497,437	-8
Off-site Releases (Transfers of Metals)**	**12,015,360**	**12,213,105**	**18,026,300**	**16,344,396**	**14,966,522**	**14,549,179**	**2,533,820**	**21**
Total Releases On- and Off-site	**19,491,877**	**19,952,185**	**27,493,758**	**25,893,341**	**23,466,606**	**21,211,449**	**1,719,573**	**9**

Note: Canada and US data only. Mexico data not available for 1995–2000. Data are from NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data, in combination with other information, can be used as a starting point in evaluating exposures that may result from releases and other management activities which involve these chemicals.

* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

** Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

Releases and Transfers from Manufacturing Industries, 1995–2000

The threshold for reporting lead and its compounds changed for 2001 in TRI and for 2002 in NPRI. Therefore, amounts reported for 2001 and prior years do not compare with those reported for 2002. Also, only facilities in the manufacturing sectors are included because only these sectors were included in TRI reporting in 1995.

- For 1995–2000, under the higher threshold, total releases of lead and its compounds from industries in the matched data set decreased by 1 percent. This included a 17-percent reduction in on-site releases, but an 11-percent increase in off-site releases (transfers to disposal).
- NPRI facilities reported a decrease of 46 percent in total releases, including a 51-percent decrease in on-site releases and a 42-percent decrease in off-site releases (transfers to disposal).
- TRI facilities reported an increase of 9 percent in total releases, with an increase of 21 percent in off-site releases (transfers to disposal) and an increase of 17 percent in on-site underground injection. Total on-site releases decreased by 11 percent.

10.3 Mercury and its Compounds

Mercury is a persistent, bioaccumulative compound with health and environmental effects. Health effects from exposure to mercury include damage to the stomach and large intestine, permanent damage to the brain and kidneys, lung damage, increased blood pressure and heart rate, and permanent damage to unborn children (US EPA 2002). Inorganic mercury salts also cause health problems, especially kidney failure and gastrointestinal damage. Highly irritating, they can cause blisters and ulcers on the lips and tongue, or rashes, excessive sweating, irritability, muscle twitching, and high blood pressure (Health Canada 2002).

Methylmercury is both a developmental toxicant and a neurotoxicant. When pregnant women eat fish contaminated with mercury, the methylmercury can cross the placenta and distribute throughout the body of the developing child. It readily accumulates in the brain. Depending on how much is absorbed, infants exposed to methylmercury in the womb can appear normal at birth but later show reduced attention, focus, fine motor function, language and drawing ability, and memory. These children may struggle to keep up at school and require special education or remedial classes (National Academy of Science 2000, Goldman and Shannon 2001). Exposure to mercury can also damage the reproductive and neurological development of wildlife. High levels of mercury in fish are one of the main reasons for fish consumption advisories.

Mercury and its compounds have been reported to NPRI and TRI since the programs' inception. However, for the 2000 reporting year, both NPRI and TRI lowered the reporting threshold for mercury and its compounds. This change increased the number of facilities and the amount of mercury reported, resulting in an improved picture of releases and transfers of mercury. NPRI lowered the activity threshold from 10 tonnes to 5 kg manufactured, processed or otherwise used. TRI lowered the activity threshold from 25,000 pounds (11 tonnes) manufactured or processed or 10,000 pounds

Table 10–16. Summary of Total Reported Amounts of Releases and Transfers in North America for Mercury and its Compounds, NPRI and TRI, 2002

	North America		NPRI		TRI		NPRI as % of North	TRI as % of North
	Number		Number		Number		American Total	American Total
Total Facilities	1,787		211		1,576		12	88
Total Forms	1,808		211		1,597		12	88
Releases On- and Off-site	**kg**	**%**	**kg**	**%**	**kg**	**%**		
On-site Releases	**157,693**	**35**	**6,778**	**8**	**150,915**	**41**	**4**	**96**
Air	65,901	15	4,966	6	60,935	16	8	92
Surface Water	608	0.1	59	0.1	549	0.1	10	90
Underground Injection	9,163	2	0.02	0	9,163	2	0	100
Land	82,020	18	1,752	2	80,268	22	2	98
Off-site Releases (Transfers of Metals)*	**91,361**	**20**	**13,422**	**16**	**77,938**	**21**	**15**	**85**
Total Reported Releases On- and Off-site	**249,053**	**55**	**20,200**	**24**	**228,853**	**62**	**8**	**92**
Off-site Releases Omitted for Adjustment Analysis**	5,430		527		4,904		10	90
Total Reported Releases On- and Off-site (adjusted)***	**243,623**		**19,674**		**223,949**		**8**	**92**
Off-site Transfers to Recycling	**204,217**	**45**	**63,579**	**76**	**140,639**	**38**	**31**	**69**
Total Reported Amounts of Releases and Transfers	**453,271**	**100**	**83,779**	**100**	**369,492**	**100**	**18**	**82**

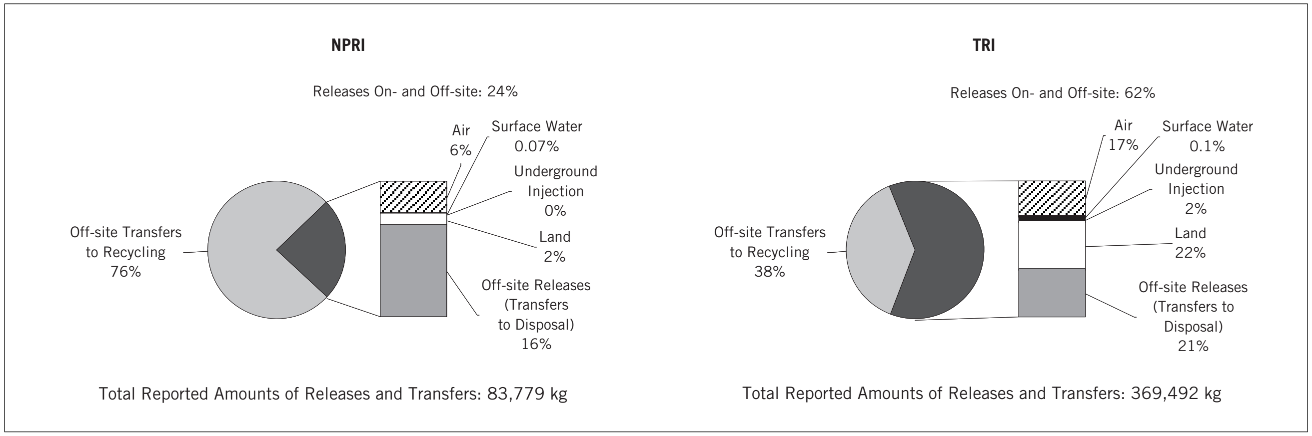
Note: Canada and US data only. Mexico data not available for 2002. Data are NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data, in combination with other information, can be used as a starting point in evaluating exposures that may result from releases and other management activities which involve these chemicals.

* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

** Off-site releases also reported as on-site releases by another NPRI or TRI facility. This amount is subtracted from total reported releases on- and off-site to get total releases on- and off-site (adjusted).

*** Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

Figure 10–3. Percent of Releases and Transfers of Mercury and its Compounds by Type, NPRI and TRI, 2002



(4.5 tonnes) otherwise used to 10 lbs (4.5 kg). The employee threshold remains at the equivalent of 10 employees for both NPRI and TRI. Elemental mercury and its inorganic compounds were on the list of chemicals to be reported under the RETC program for the 2002 reporting year; however, no data are publicly available. The following section provides information on mercury and its compounds from the matched data for 2000–2002.

10.3.1 Releases and Transfers of Mercury and its Compounds, 2002

- In 2002, 1,787 facilities—211 in NPRI and 1,576 in TRI—reported more than 453,000 kg of mercury and its compounds released or transferred by the matched set of industries.
- Total reported releases on- and off-site of mercury and its compounds were almost 244,000 kg. Eight percent was reported by NPRI facilities and 92 percent was from TRI facilities.
- For both NPRI and TRI, on-site air releases represented about one-quarter of total reported releases.
- On-site land disposal plus off-site releases (mainly transfers to land disposal) accounted for two-thirds of total releases. However, TRI facilities had about the same amount of land disposal on- and off-site while NPRI facilities mainly transferred mercury and its compounds off-site for land disposal.
- About 9,000 kg were injected underground on-site, mainly by TRI facilities and 608 kg were discharged to surface water with 10 percent from NPRI facilities and 90 percent from TRI facilities.
- Mercury and its compounds in off-site transfers to recycling were 204,000 kg in 2002. NPRI facilities reported almost one-third of the total in transfers to recycling. One facility, Teck Cominco Metals Ltd., in Trail, British Columbia, reported 42,500 kg transferred to recycling, two-thirds of the total transfers to recycling reported by all

NPRI facilities in 2002. The transfers went to the Bethlehem Apparatus Company in Hellerton, Pennsylvania—a TRI facility that reported under SIC codes for manufacture of inorganic chemicals and special industrial machinery.

State and Provinces

- One province and two states (British Columbia, Texas and Illinois) together reported 30 percent of the total reported amounts of releases and transfers of mercury and its compounds in 2002. One primary metals facility, Teck Cominco Metals Ltd., in Trail, British Columbia, reported 42,500 kg transferred to recycling, 97 percent of the total for the province and two-thirds of the total transfers to recycling reported by all NPRI facilities in 2002.
- Three states (Arizona, Alabama and Louisiana) together reported more than one-quarter of the total releases of mercury and its compounds in 2002. Arizona and Alabama reported the largest on-site land disposal and Louisiana reported the largest underground injection.
- One primary metals facility, BHP Copper in San Manuel, Arizona, reported almost 25,000 kg of on-site land disposal, almost all of the on-site land disposal reported by Arizona facilities in 2002. The facility reported that it had a one-time amount of on-site land disposal due to discontinued operations related to mining.
- One hazardous waste facility, Clean Harbors Plaquemine L.L.C. in Plaquemine, Louisiana, reported almost 8,400 kg injected underground on-site, accounting for 91 percent of all underground injection in 2002.
- Three states (Texas, Ohio and Pennsylvania) reported the largest air emissions of mercury and its compounds in 2002. For Texas and Ohio, electric utilities accounted for approximately 60 percent of total air emissions. Electric utilities reported three-quarters of the air emissions of mercury and its compounds in Pennsylvania.

Table 10–17. Releases and Transfers of Mercury and its Compounds, by State/Province, 2002

		Releases On- and Off-site										
State/Province	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Off-site Releases (Transfers to Disposal)* (kg)	Total Releases On- and Off-site kg	Total Releases On- and Off-site Rank	Transfers to Recycling (kg)	Total Releases and Transfers kg	Total Releases and Transfers Rank
Alabama	51	2,719	16	4	12,242	14,981	5,727	20,708	2	1,174	21,882	7
Alaska	3	5	0	0	0	6	0	6	61	0	6	62
Alberta	30	863	0	0	264	1,127	729	1,856	27	567	2,423	33
Arizona	15	761	0	0	25,275	26,036	121	26,157	1	1,121	27,278	4
Arkansas	16	673	1	0	30	703	109	812	44	2,055	2,867	28
British Columbia	20	221	19	0	0	240	8,475	8,715	9	43,659	52,374	1
California	80	1,868	2	0	3,055	4,925	1,574	6,499	12	2,135	8,634	15
Colorado	27	370	1	0	347	718	247	965	42	207	1,172	46
Connecticut	12	53	0	0	0	53	3,869	3,922	16	1,117	5,039	20
Delaware	9	691	9	0	88	788	565	1,353	39	12,748	14,102	11
District of Columbia	0	0	0	0	0	0	0	0	--	0	0	63
Florida	56	1,252	5	0	1,869	3,127	42	3,169	20	2,582	5,751	18
Georgia	29	1,927	7	0	464	2,398	149	2,547	24	1,087	3,634	25
Hawaii	7	128	2	0	0	130	14	144	54	0	144	55
Idaho	4	281	0	0	628	909	0	909	43	1	910	47
Illinois	68	2,579	19	0	772	3,370	15,912	19,282	4	22,482	41,763	3
Indiana	64	3,482	53	0	1,376	4,911	334	5,245	13	4,774	10,019	14
Iowa	45	1,219	3	0	554	1,775	240	2,015	26	564	2,579	31
Kansas	21	1,182	0	0	174	1,356	150	1,506	33	107	1,614	40
Kentucky	48	1,690	35	8	999	2,733	12,687	15,420	5	1,550	16,970	9
Louisiana	49	1,821	28	8,363	2,442	12,654	7,712	20,365	3	456	20,821	8
Maine	8	37	1	0	9	46	15	61	57	0	61	59
Manitoba	9	1,356	4	0	3	1,363	6	1,369	37	1,082	2,451	32
Maryland	18	1,000	0	35	217	1,253	407	1,660	30	115	1,775	39
Massachusetts	21	87	0	0	2	89	154	243	52	553	796	48
Michigan	54	1,588	9	0	644	2,241	380	2,621	23	1,480	4,100	23
Minnesota	29	833	0	0	387	1,220	192	1,412	35	151	1,562	41
Mississippi	16	352	81	680	4,062	5,176	25	5,201	14	95	5,296	19
Missouri	36	1,719	1	0	153	1,872	1,477	3,349	18	1,628	4,977	21
Montana	12	427	0	0	285	712	18	730	45	14	744	50
Nebraska	14	270	0	0	409	679	934	1,612	32	216	1,828	38
Nevada	9	254	0	0	2,123	2,377	7	2,385	25	7	2,392	34
New Brunswick	11	237	2	0	21	259	174	434	49	65	499	51
New Hampshire	6	12	0	0	4	16	51	67	56	60	127	56
New Jersey	29	374	1	0	56	431	226	657	47	2,069	2,726	29
New Mexico	8	554	0	0	501	1,055	442	1,497	34	0	1,497	42
New York	35	636	11	0	598	1,246	120	1,365	38	706	2,072	36
Newfoundland and Labrador	2	8	0	0	26	34	25	59	58	0	59	60
North Carolina	38	2,157	10	0	1,225	3,392	220	3,612	17	83	3,695	24
North Dakota	9	1,080	0	0	112	1,193	215	1,408	36	0	1,408	43
Nova Scotia	8	171	0	0	17	188	1,090	1,278	41	0	1,278	45
Ohio	96	4,922	8	25	1,736	6,691	1,761	8,452	10	5,050	13,502	12
Oklahoma	21	725	6	0	2,314	3,045	285	3,330	19	29	3,359	26
Ontario	83	1,191	9	0	1,115	2,315	2,164	4,479	15	2,994	7,472	17
Oregon	15	332	2	0	304	638	50	688	46	56	745	49
Pennsylvania	111	4,175	32	0	2,170	6,377	8,029	14,406	6	12,361	26,767	5
Prince Edward Island	1	12	0	0	0	12	0	12	60	0	12	61
Puerto Rico	11	204	66	0	36	306	0	307	51	1	307	53
Quebec	42	537	26	0	307	869	749	1,618	31	15,209	16,827	10
Rhode Island	5	4	2	0	0	5	38	43	59	78	121	57
Saskatchewan	5	370	0	0	0	370	11	381	50	2	384	52
South Carolina	36	1,003	43	0	636	1,683	84	1,767	29	333	2,100	35
South Dakota	6	127	0	0	27	155	0	155	53	3	157	54
Tennessee	37	1,677	32	0	1,207	2,916	8,718	11,635	8	257	11,891	13
Texas	120	7,124	24	46	2,981	10,174	2,073	12,248	7	30,000	42,248	2
Utah	15	356	2	0	2,421	2,779	243	3,022	21	0	3,022	27
Vermont	1	0	0	0	0	0	0	0	--	2,676	2,676	30
Virgin Islands	3	81	0	0	1	82	1	83	55	0	83	58
Virginia	42	989	13	0	567	1,569	278	1,847	28	67	1,914	37
Washington	19	195	4	0	101	300	248	548	48	4,219	4,767	22
West Virginia	48	2,311	18	0	4,222	6,551	867	7,418	11	735	8,152	16
Wisconsin	46	1,776	2	0	38	1,816	843	2,659	22	23,423	26,082	6
Wyoming	19	854	0	0	403	1,256	85	1,342	40	14	1,355	44
Total	1,808	65,901	608	9,163	82,020	157,693	91,361	249,053		204,217	453,271	

Note: Canada and US data only. Mexico data not available for 2002. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings are meant to imply that a facility, state or province is not meeting its legal requirements. The data do not predict levels of exposure of the public to those chemicals. Transfers are from facilities located in the state/province.

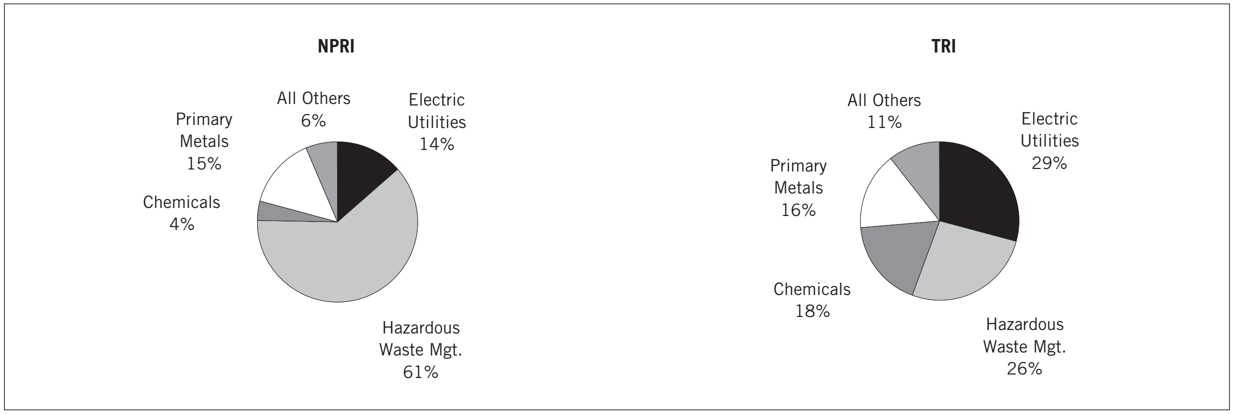
* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

Table 10–18. Releases and Transfers of Mercury and its Compounds, by Industry, 2002 (Ranked by Total Reported Releases On- and Off-site)

US SIC Code	Industry	Reported Releases On- and Off-site: Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Off-site Releases (Transfers to Disposal) (kg)	Total Reported Releases On- and Off-site kg	Rank	Transfers to Recycling (kg)	Total Releases and Transfers kg	Rank
495/738	Hazardous Waste Mgt./Solvent Recovery	875	1	8,388	21,570	30,834	42,322	73,156	1	109,080	182,237	1
491/493	Electric Utilities	42,986	229	0	18,493	61,708	7,553	69,261	2	3,650	72,911	3
28	Chemicals	6,722	165	681	9,595	17,164	24,846	42,009	3	15,680	57,689	4
33	Primary Metals	6,208	78	0	26,206	32,492	6,633	39,125	4	48,745	87,870	2
32	Stone/Clay/Glass Products	6,021	2	8	1,439	7,469	100	7,569	5	538	8,107	7
34	Fabricated Metals Products	22	0	0	0	22	5,248	5,270	6	108	5,379	8
12	Coal Mining	4	1	39	4,078	4,122	6	4,129	7	0.05	4,129	9
36	Electronic/Electrical Equipment	211	0	0	0	212	2,438	2,650	8	8,452	11,102	6
26	Paper Products	1,176	59	0	474	1,709	394	2,103	9	378	2,481	10
29	Petroleum and Coal Products	711	33	45	79	868	953	1,821	10	603	2,424	11
--	Multiple codes 20–39*	703	36	0	78	817	506	1,323	11	464	1,787	12
20	Food Products	121	0	0	9	130	91	221	12	52	274	16
38	Measurement/Photographic Instruments	48	2	0	0	49	100	150	13	14,702	14,852	5
21	Tobacco Products	43	1	0	0	44	41	85	14	0	85	18
39	Misc. Manufacturing Industries	7	0	0	0	7	53	60	15	253	313	15
37	Transportation Equipment	14	1	0	0	15	26	41	16	847	887	13
30	Rubber and Plastics Products	6	0	0	0	6	26	32	17	80	112	17
5169	Chemical Wholesalers	0	0	0	0	0	20	20	18	1	21	19
5171	Petroleum Bulk Terminals	11	2	0	0	12	4	17	19	2	18	20
22	Textile Mill Products	9	0	0	0	9	0	9	20	0	9	22
24	Lumber and Wood Products	2	0	0	0	2	0	2	21	10	12	21
35	Industrial Machinery	0	0	0	0	0	0	0.1	22	573	573	14
25	Furniture and Fixtures	0	0	0	0	0	0	0	--	0	0	--
	Total	**65,901**	**608**	**9,163**	**82,020**	**157,693**	**91,361**	**249,053**		**204,217**	**453,271**	

Note: Canada and US data only. Mexico data not available for 2002.
* Multiple SIC codes reported only in TRI.

Figure 10–4. Percentage Contributions of Top Industry Sectors to Total Reported Amounts of Releases, NPRI and TRI, 2002



Industry Sectors

- Hazardous waste management facilities reported the largest amounts of both releases and total releases and transfers of mercury and its compounds in 2002, with 53 percent of all transfers to recycling, 46 percent of off-site releases (transfers to disposal) and 26 percent of on-site land releases. This sector also reported the largest amounts of mercury and its compounds sent to underground injection, 92 percent of the total, due to reporting of almost 8,400 kg injected underground by the Clean Harbors Plaquemine L.L.C. facility in Plaquemine, Louisiana.
- Electric utilities reported the second-largest total releases, with 28 percent of all releases of mercury and its compounds in 2002. Electric utilities reported the largest air emissions, with almost 43,000 kg, representing 65 percent of on-site air emissions reported by all industry sectors in 2002. This sector also reported the third-largest on-site land releases, with 23 percent of total on-site land releases in 2002, and largest discharges to water, with 38 percent of the total.
- For TRI, electric utilities reported the largest total releases (29 percent of total TRI releases of mercury and its compounds) with the hazardous waste management sector the second-largest (26 percent).
- For NPRI, the hazardous waste management sector reported the largest total releases with 61 percent of total releases of mercury and its compounds in 2002. The primary metals sector in NPRI reported the second-largest (15 percent) and electric utilities the third-largest (14 percent).

Facilities with Largest Releases

- The facility with the largest releases of mercury and its compounds was the primary metals facility, BHP Copper in San Manual, Arizona, with 25,000 kg of on-site land disposal. The facility reported that it had a one-time amount of on-site land disposal due to discontinued operations related to mining.
- The facility with the second-largest releases was the chemical manufacturer, Westlake Vinyls in Calvert City, Kentucky, with 12,600 kg transferred off-site for disposal.
- Three hazardous waste management facilities (the industry with the largest total releases of mercury and its compounds in 2002) were ranked third through fifth in 2002. They were the Chemical Waste Management facility located in Emelle, Alabama, and two facilities owned by Clean Harbors (located in Chicago, Illinois, and Plaquemine, Louisiana).
- Nexen Chemicals Canada L.P., a hazardous waste management facility in Squamish, British Columbia, ranked sixth in North America and first in NPRI for total releases of mercury and its compounds.
- Ten facilities accounted for 11 percent of total air emissions of mercury and its compounds in 2002.
- Reporting the largest on-site air emissions of mercury and its compounds in 2002 was the Hudson Bay Mining and Smelting primary metals facility in Flin Flon, Manitoba, with 1,334 kg. The facility reporting the second-largest air emissions was Lehigh Southwest Cement Co. in Tehachapi, California, with 1,064 kg.
- Ten facilities accounted for half of all on-site surface water discharges of mercury and its compounds in 2002.
- The facility reporting the largest surface water discharges was the Kerr-McGee Chemical L.L.C. Pigment Plant in Hamilton, Mississippi, with 78 kg. The electric utility Prepa San Juan Steam Plant in Puerto Nuevo, Puerto Rico reported the second-largest such discharges with 55 kg.

Table 10–19. Facilities in US and Canada with the Largest Total Reported Releases On- and Off-site of Mercury and its Compounds, 2002

					On-site Releases						
North American Rank	Facility	City, State/ Province	SIC Codes Canada	SIC Codes US	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total On-site and Off-site Releases Reported (kg)
	US										
1	BHP Copper N.A. San Manuel Ops.	San Manuel, AZ		33	0	0	0	24,943	24,943	0	24,943
2	Westlake Vinyls Inc., Westlake Chemical Corp.	Calvert City, KY		28	3	4	0	0	7	12,597	12,604
3	Chemical Waste Management, Waste Management Inc.	Emelle, AL		495/738	2	0	0	9,977	9,980	0	9,980
4	Clean Harbors Services Inc.	Chicago, IL		495/738	0	0	0	0	0	9,053	9,053
5	Clean Harbors Plaquemine L.L.C.	Plaquemine, LA		495/738	0	0	8,363	0	8,363	21	8,384
	Canada										
6	Nexen Chemicals Canada Limited Partnership, Squamish	Squamish, BC	37	495/738	24	0	0	0	24	7,800	7,824
21	Hudson Bay Mining and Smelting Company Ltd., Metallurgical Complex, Anglo American PLC	Flin Flon, MB	29	33	1,334	0	0	0	1,334	0	1,334
25	Clean Harbors Canada, Inc., Debert Central Transfer Facility	Debert, NS	77	495/738	0	0	0	0	0	1,090	1,090
49	Clean Harbors Canada, Inc., Lambton Facility	Corunna, ON	49	495/738	94	0	0	588	682	0	682
55	Clean Harbors Canada, Inc. (Niagara)	Thorold, ON	49	495/738	0	0	0	0	0	640	640

Table 10–20. Facilities in North America with Largest Total On-site Air Releases of Mercury and its Compounds, 2002

Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Total On-site Air Releases (kg)
1	Hudson Bay Mining and Smelting Company Ltd., Metallurgical Complex, Anglo American PLC	Flin Flon, MB	29	33	1,334
2	Lehigh Southwest Cement Co.	Tehachapi, CA		32	1,064
3	Limestone Electric Generating Station, Texas Genco L.P.	Jewett, TX		491/493	816
4	Alcoa World Alumina L.L.C. Point Comfort Ops.	Point Comfort, TX		28	659
5	Ashta Chemicals Inc.	Ashtabula, OH		28	633
6	TXU Monticello Steam Electric Station & Lignite Mine	Mount Pleasant, TX		491/493	600
7	American Electric Power, Conesville Plant	Conesville, OH		491/493	590
8	Essroc Cement Corp.	Logansport, IN		32	572
9	Reliant Energy, Keystone Power Plant	Shelocta, PA		491/493	560
10	PPG Inds. Inc.	New Martinsville, WV		28	559
	Subtotal				**7,387**
	% of Total				**11**
	Total				**65,901**

Note: Canada and US data only. Mexico data not available for 2002.

Table 10–21. Facilities in North America with Largest Total On-site Surface Water Discharges of Mercury and its Compounds, 2002

Rank	Facility	City, State/Province	SIC Code Canada	SIC Code US	Total Surface Water Discharges (kg)
1	Kerr-McGee Chemical L.L.C. Pigment Plant	Hamilton, MS		28	78
2	Prepa San Juan Steam Plant, Puerto Rico Electric Power Authority	Puerto Nuevo, PR		491/493	55
3	USS Gary Works, US Steel Corp.	Gary, IN		33	50
4	Bruce Mansfield, FirstEnergy Corp.	Shippingport, PA		491/493	26
5	Owensboro Municipal Utilities, Elmer Smith Station	Owensboro, KY		491/493	25
6	Scana Urquhart Station	Beech Island, SC		491/493	19
7	PPG Inds. Inc.	New Martinsville, WV		28	15
8	Teck Cominco Metals Ltd., Trail Operations	Trail, BC	29	33	13
9	Compagnie Abitibi Consolidated du Canada, Division Belgo	Shawinigan, QC	27	26	11
10	Caterpillar Inc. Mossville Complex	Mossville, IL		Mult.	10
	Subtotal				**303**
	% of Total				**50**
	Total				**608**

Note: Canada and US data only. Mexico data not available for 2002.

Table 10–22. Total Reported Amounts of Releases and Transfers in North America for Mercury and its Compounds, 2000–2002

	North America				
	2000	2001	2002	Change 2000–2002	
	Number	Number	Number	Number	%
Total Facilities	1,654	1,714	1,717	63	4
Total Forms	1,693	1,740	1,738	45	3
	kg	kg	kg	kg	%
On-site Releases*	**149,186**	**145,493**	**157,680**	**8,494**	**6**
Air	72,912	67,335	65,891	-7,022	-10
Surface Water	1,162	884	607	-555	-48
Underground Injection	1,090	879	9,163	8,073	741
Land	74,022	76,395	82,020	7,997	11
Off-site Releases (Transfers of Metals)**	**426,193**	**115,243**	**91,356**	**-334,837**	**-79**
Total Reported Releases On- and Off-site	**575,379**	**260,737**	**249,037**	**-326,343**	**-57**
Off-site Releases Omitted for Adjustment Analysis***	21,699	11,442	5,430	-16,269	-75
Total Reported Releases On- and Off-site (adjusted)***	**553,680**	**249,295**	**243,606**	**-310,073**	**-56**
Off-site Transfers to Recycling	**104,426**	**88,083**	**204,216**	**99,790**	**96**
Total Reported Amounts of Releases and Transfers	**679,805**	**348,820**	**453,252**	**-226,552**	**-33**

	NPRI					TRI				
	2000	2001	2002	Change 2000–2002		2000	2001	2002	Change 2000–2002	
	Number	Number	Number	Number	%	Number	Number	Number	Number	%
Total Facilities	156	186	210	54	35	1,498	1,528	1,507	9	1
Total Forms	156	186	210	54	35	1,537	1,554	1,528	-9	-1
	kg	kg	kg	kg	%	kg	kg	kg	kg	%
On-site Releases*	**8,352**	**20,033**	**6,778**	**-1,573**	**-19**	**140,834**	**125,460**	**150,902**	**10,068**	**7**
Air	5,488	5,285	4,966	-522	-10	67,424	62,050	60,924	-6,500	-10
Surface Water	67	64	59	-7	-11	1,095	820	547	-547	-50
Underground Injection	26	22	0	-26	-100	1,064	858	9,163	8,099	761
Land	2,771	14,663	1,752	-1,019	-37	71,251	61,732	80,268	9,016	13
Off-site Releases (Transfers of Metals)**	**18,963**	**15,653**	**13,422**	**-5,541**	**-29**	**407,230**	**99,590**	**77,934**	**-329,296**	**-81**
Total Reported Releases On- and Off-site	**27,315**	**35,687**	**20,200**	**-7,115**	**-26**	**548,064**	**225,050**	**228,836**	**-319,228**	**-58**
Off-site Releases Omitted for Adjustment Analysis***	1,716	1,078	527	-1,189	-69	19,984	10,363	4,904	-15,080	-75
Total Reported Releases On- and Off-site (adjusted)***	**25,600**	**34,608**	**19,674**	**-5,926**	**-23**	**528,080**	**214,687**	**223,932**	**-304,148**	**-58**
Off-site Transfers to Recycling	**30,182**	**15,894**	**63,579**	**33,397**	**111**	**74,244**	**72,190**	**140,637**	**66,394**	**89**
Total Reported Amounts of Releases and Transfers	**57,497**	**51,580**	**83,779**	**26,282**	**46**	**622,308**	**297,240**	**369,473**	**-252,834**	**-41**

Note: Canada and US data only. Mexico data not available for 2000–2002. Data are from NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data, in combination with other information, can be used as a starting point in evaluating exposures that may result from releases and other management activities which involve these chemicals.

* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

** Off-site releases also reported as on-site releases by another NPRI or TRI facility. This amount is subtracted from total reported releases on- and off-site to get total releases on- and off-site (adjusted).

*** Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

10.3.2 Releases and Transfers, 2000–2002

This section examines changes in releases and transfers of mercury and its compounds from 2000 to 2002. It is not possible to have a longer time trend as the reporting thresholds for mercury were lowered in 2000.

- From 2000 to 2002, an additional 63 facilities reported on mercury and its compounds. Most of these were NPRI facilities, which increased by 54. TRI facilities increased by nine.
- Total releases and transfers decreased by 33 percent in North America from 2000 to 2002. However, this was due to a decrease of 41 percent as reported by TRI facilities. NPRI facilities reported an increase of 46 percent or 26,300 kg. However, one facility (Teck Cominco Metals Ltd. in Trail, British Columbia) reported 42,490 kg of mercury and its compounds in transfers to recycling in 2002 with none in 2000 or 2001. Without the transfers to recycling of this one facility, NPRI would have shown a decrease of 28 percent.
- Total releases of mercury and its compounds decreased from 2000 to 2002 by 57 percent. NPRI releases decreased by 26 percent and TRI releases decreased by 58 percent.
- On-site air emissions of mercury and its compounds decreased by 10 percent in both NPRI and TRI from 2000 to 2002.
- Discharges of mercury and its compounds to water decreased by 48 percent, largely driven by TRI reductions.
- Underground injection increased by 8,073 kg due to reporting by one facility (Clean Harbors Plaquemine L.L.C. in Plaquemine, Louisiana) that reported an increase of 8,166 kg in underground injection of mercury compounds from 2000 to 2002.

- Most facilities with the largest decreases and increases in releases of mercury and its compounds from 2000 to 2002 were hazardous waste or primary metals facilities.
- The hazardous waste facility Onyx Environmental Services in Port Arthur, Texas, reported the largest decrease in total releases of mercury and its compounds from 2000 to 2002, with a decrease of 261,575 kg primarily in transfers to disposal, although it also decreased air emissions by 221 kg.
- The primary metals facility BHP Copper N.A. San Manuel Ops., San Manuel, Arizona, had the largest increase with 24,943 kg in on-site land releases in 2002 but none in 2000. The facility reported that its on-site land disposal amount was a one-time event due to discontinued operations related to mining.
- The primary metals ASARCO Inc. in East Helena, Montana, had the largest decrease in air emissions of mercury and its compounds from 2000 to 2002. It reported 1,484 kg of air emissions in 2000 and none in 2002. This facility has closed its mining operations at this site.
- The Essroc Cement Corp. facility in Logansport, Indiana, reported the largest increase in air emissions, with an increase of 494 kg of mercury and its compounds from 2000 to 2002.

Table 10–23. Facilities in US and Canada with Largest Change in Total Releases of Mercury and its Compounds, 2000–2002

					2000						
North American Rank	Facility	City, State/ Province	SIC Codes Canada	SIC Codes US	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Off-site Releases (Transfers to Disposal) (kg)	Total Releases On- and Off-site (kg)
Decreases											
US											
1	Onyx Environmental Services L.L.C.	Port Arthur, TX		495/738	391	0	0	0	391	261,555	261,946
2	Clean Harbors of Braintree Inc., Clean Harbors Inc.	Braintree, MA		495/738	0	0	0	0	0	26,532	26,532
3	Zinc Corp. of America, Monaca Smelter, Horsehead Inds.	Monaca, PA		33	59	0	0	0	59	24,535	24,594
4	Clean Harbors Services Inc.	Chicago, IL		495/738	0	0	0	0	0	20,634	20,634
Canada											
11	Services environnementaux Clean Harbors Québec, Inc, Centre de transfert de Thurso	Thurso, QC	77	495/738	0	0	0	0	0	4,372	4,372
16	Société en commandite Revenu Noranda	Valleyfield, QC	29	33	50	2	0	0	52	2,707	2,759
19	Philip Services Inc., Rexdale Facility	Etobicoke, ON	77	495/738	0	0	0	0	0	1,675	1,675
22	Clean Harbors Canada Inc., Lambton Facility	Corunna, ON	49	495/738	407	0	0	1,700	2,107	0	2,107
Increases											
US											
1	BHP Copper N.A. San Manuel Ops.	San Manuel, AZ		33	0	0	0	0	0	0	0
2	Clean Harbors Plaquemine L.L.C.	Plaquemine, LA		495/738	0	0	197	0	197	0	197
3	Westlake Vinyls Inc., Westlake Chemical Corp.	Calvert City, KY		28	499	5	0	0	503	4,350	4,853
4	Bredero Price, Shawcor Ltd.	Theodore, AL		34	0	0	0	0	0	0	0
Canada											
7	Nexen Chemicals Canada Limited Partnership, Squamish	Squamish, BC	37	495/738	0	6	0	0	6	3,800	3,806
15	Clean Harbors Canada, Inc., Debert Central Transfer Facility	Debert, NS	77	495/738	0	0	0	0	0	0	0
26	349977 Ontario Limited, Lacombe Waste Services	Ottawa, ON	99	495/738	0	0	0	0	0	0	0
30	Clean Harbors Canada, Inc. (Niagara)	Thorold, ON	49	495/738	0	0	0	0	0	283	283

Table 10–24. Facilities in US and Canada with Largest Change in On-site Air Releases of Mercury and its Compounds, 2000–2002

					Air		
North American Rank	Facility	City, State/ Province	SIC Codes Canada	SIC Codes US	2000 (kg)	2002 (kg)	Change 2000–2002 (kg)
Decreases							
US							
1	ASARCO Inc., Americas Mining Corp.	East Helena, MT		33	1,484	0	-1,484
2	Mt. Storm Power Station, Dominion Resources Inc.	Mount Storm, WV		491/493	862	177	-685
3	Westlake Vinyls Inc., Westlake Chemical Corp.	Calvert City, KY		28	499	3	-496
4	Chesterfield Power Station, Dominion Resources Inc.	Chester, VA		491/493	590	163	-427
Canada							
6	Clean Harbors Canada Inc., Lambton Facility	Corunna, ON	49	495/738	407	94	-313
8	Osram Sylvania Ltée	Drummondville, QC	33	36	334	50	-284
18	Noranda Inc, Fonderie Horne	Rouyn-Noranda, QC	29	33	330	178	-152
59	Nova Scotia Power Incorporated, Lingan Generating Station	Lingan, NS	41	491/493	173	104	-69
Increases							
US							
1	Essroc Cement Corp.	Logansport, IN		32	78	572	494
2	Big Cajun 2, NRG Energy Inc.	New Roads, LA		491/493	2	399	397
3	International Metals Reclamation Co. Inc. (Inmetco), Inco US Inc.	Ellwood City, PA		33	0	345	345
4	Nucor Steel Hertford County, Nucor Steel	Cofield, NC		33	3	308	305
Canada							
13	Clean Harbors Mercier, Inc.	Mercier, QC	99	495/738	0	165	165
23	TransAlta Corporation, Wabamun Thermal Generating Plant	Wabamun, AB	49	491/493	54	153	99
28	SaskPower, Boundary Dam Power Station	Estevan, SK	41	491/493	105	191	86
34	Hudson Bay Mining and Smelting Company Ltd., Metallurgical Complex, Anglo American PLC	Flin Flon, MB	29	33	1,266	1,334	68

Table 10–23. (*continued*)

North American Rank	Facility	2002 Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Off-site Releases (Transfers to Disposal) (kg)	Total Releases On- and Off-site (kg)	Change in Total Releases On- and Off-site (kg)
Decreases									
US									
1	Onyx Environmental Services L.L.C.	170	0	0	0	171	201	371	-261,575
2	Clean Harbors of Braintree Inc., Clean Harbors Inc.	0	0	0	0	0	0	0	-26,532
3	Zinc Corp. of America Monaca Smelter, Horsehead Inds.	56	0	0	0	56	4,163	4,219	-20,375
4	Clean Harbors Services Inc.	0	0	0	0	0	9,053	9,053	-11,581
Canada									
11	Services environnementaux Clean Harbors Québec, Inc, Centre de transfert de Thurso	0	0	0	0	0	0	0	-4,372
16	Société en commandite Revenu Noranda	4	1	0	0	5	544	549	-2,210
19	Philip Services Inc., Rexdale Facility	0	0	0	0	0	0	0	-1,675
22	Clean Harbors Canada Inc., Lambton Facility	94	0	0	588	682	0	682	-1,425
Increases									
US									
1	BHP Copper N.A. San Manuel Ops.	0	0	0	24,943	24,943	0	24,943	24,943
2	Clean Harbors Plaquemine L.L.C.	0	0	8,363	0	8,363	21	8,384	8,187
3	Westlake Vinyls Inc., Westlake Chemical Corp.	3	4	0	0	7	12,597	12,604	7,751
4	Bredero Price, Shawcor Ltd.	0	0	0	0	0	5,243	5,243	5,243
Canada									
7	Nexen Chemicals Canada Limited Partnership, Squamish	24	0	0	0	24	7,800	7,824	4,018
15	Clean Harbors Canada, Inc., Debert Central Transfer Facility	0	0	0	0	0	1,090	1,090	1,090
26	349977 Ontario Limited, Lacombe Waste Services	0	0	0	0	0	432	432	432
30	Clean Harbors Canada, Inc. (Niagara)	**0**	**0**	**0**	**0**	**0**	**640**	**640**	**357**

- The electric utility Lansing Board of Water & Light facility in Lansing, Michigan, reported the largest decrease in discharges to surface water of mercury and its compounds, with 215 kg in 2000 and none in 2002.
- The electric utility Prepa San Juan Steam Plant in Puerto Nuevo, Puerto Rico, had the largest increase in discharges to surface water of mercury and its compounds, with 55 kg in 2002, up from 2 kg in 2000.

Table 10–25. Facilities in US and Canada with Largest Change in On-site Surface Water Releases of Mercury and its Compounds, 2000–2002

North American Rank	Facility	City, State/ Province	SIC Codes Canada	SIC Codes US	Surface Water 2000 (kg)	Surface Water 2002 (kg)	Surface Water Change 2000–2002 (kg)
Decreases							
US							
1	Lansing Board of Water & Light–Eckert	Lansing, MI		491/493	215	0	-215
2	US TVA Shawnee Fossil Plant, US Tennessee Valley Authority	West Paducah, KY		491/493	118	0	-118
3	US TVA Paradise Fossil Plant, US Tennessee Valley Authority	Drakesboro, KY		491/493	99	0	-99
4	Bethlehem Steel Corp., Burns Harbor Div.	Burns Harbor, IN		33	87	0	-87
Canada							
17	Teck Cominco Metals Ltd., Trail Operations	Trail. BC	29	33	20	13	-7
18	Nexen Chemicals Canada Limited Partnership, Squamish	Squamish, BC	37	495/738	6	0	-6
22	Western Pulp Limited Partnership, Port Alice Cellulose Operation	Port Alice, BC	27	26	9	5	-4
26	Noranda Inc., Fonderie Gaspé	Murdochville, QC	29	33	4	1	-3
Increases							
US							
1	Prepa San Juan Steam Plant, Puerto Rico Electric Power Authority	Puerto Nuevo, PR		491/493	2	55	53
2	Bruce Mansfield, FirstEnergy Corp.	Shippingport, PA		491/493	0	26	26
3	Scana Urquhart Station	Beech Island, SC		491/493	0	19	19
5	PPG Inds. Inc.	New Martinsville, WV		28	5	15	10
Canada							
4	Compagnie Abitibi Consolidated du Canada, Division Belgo	Shawinigan, QC	27	26	0	11	11
16	Alcan Bauxite, Alumine et produits chimiques de spécialité, Usine Vaudreuil	Jonquière, QC	37	28	0	3	3
23	Norampac Inc., Red Rock Division	Red Rock, ON	27	26	0	2	2
31	Bowater Produits forestiers du Canada Inc., Usine de Gatineau	Gatineau, QC	27	26	0	3	4	1

10.4 Dioxins and Furans

Each member of the dioxin and furan family has a different toxicity, with 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) generally being considered the most toxic. Some members of the dioxin family are considered carcinogens and are suspected neurotoxicants, developmental toxicants, and endocrine disruptors. Dioxins and furans are considered to be persistent, bioaccumulative and toxic compounds. In Canada, dioxins and furans are considered CEPA toxic, and releases to the environment as a result of human activity are slated for virtual elimination.

Dioxins and furans are formed during incomplete combustion, and air releases are the major type of release. Human exposure occurs largely through food. The chemicals become incorporated into food when airborne dioxins are deposited onto plants that are in turn eaten by animals or when waterborne dioxins contaminate fish and aquatic animals.

Both TRI and NPRI required the reporting of dioxins and furans beginning with the 2000 reporting year. Both NPRI and TRI require reporting of a total amount for 17 congeners. However, other aspects of the reporting requirements differ in the two countries (see below). Therefore, direct comparison of the data on dioxins and furans is not possible. Both countries are considering revising their reporting on dioxins and furans in the future. This should make the reporting more comparable.

Table 10–26. Congeners of Dioxins/Furans reported to TRI and NPRI

CAS Number	Dioxin/Furan	Toxic Equivalency Factor (TEF)
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.01
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.01
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.1
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.1
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.1
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.1
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.1
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.1
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.1
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.01
39001-02-0	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.001
3268-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.001
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.05
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.5
40321-76-4	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.5
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.1
1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1

Note: The TEFs are those developed by international convention and adopted in 1989.

Table 10–27. NPRI Dioxin/Furan Reporting Requirements

Reporting Threshold: 0 grams
Amounts Reported in grams-iTEQ
Industrial Activities: reporting restricted to certain activities and meeting threshold of 10 employees or more (except no employee threshold for wood preservation or incineration)

Specific activities (10-employee threshold):	Primary Industry Sectors Reporting these Activities in 2002
Base metals smelting (copper, lead, nickel, zinc)	Metal mining, Primary metals
Smelting of secondary lead or secondary aluminum	Primary metals
Sintering process in manufacture of iron	Primary metals
Electric arc furnace in steel making and steel foundries	Primary metals
Production of magnesium	Primary metals
Manufacture of Portland cement	Stone/Clay/Glass Products
Production of chlorinated organic solvents	Chemicals
Combustion of fossil fuel to produce electricity	Electric utilities, Paper products
Combustion of salt-laden logs in pulp and paper sector	Paper products
Combustion of fuel in kraft liquor boilers in pulp and paper sector	Paper products
Specific activities (No employee threshold):	
Wood preservation using pentachlorophenol	Lumber and wood products
Non-hazardous/hospital/hazardous waste/sewage sludge incineration	Lumber and wood products, Air/Water/Solid Waste Management*, Paper products, Hazardous waste management, Sewerage systems*

Note: See *Guide for Reporting to the National Pollutant Release Inventory 2002* <http://www.ec.gc.ca/pdb/npri/npri_preinfo_e.cfm#gdocs> for complete description of activities.
* Facilities not required to report under TRI

10.4.1 Reporting Requirements

What is Reported

For TRI, dioxins and furans are reported by weight. The amounts in total grams for the 17 congeners and the distribution of the 17 congeners are also reported. The distribution represents either the distribution of the total quantity of dioxins and furans released to all media from the facility or the facility's one best media-specific distribution.

For NPRI, dioxins and furans are reported using a toxicity approach. The amounts of dioxins and furans are reported in toxic equivalents (TEQ), using the International Toxic Equivalency Factors (i-TEF) adopted by international convention in 1989, as grams-iTEQ. The International Toxic Equivalency Factors (TEF) for the 17 congeners are shown in **Table 10–26**. The amount in grams of each congener is multiplied by its TEF. The sum of the individual TEQs for all 17 congeners is reported as one amount to NPRI. This is done for each type of release and transfer.

Reporting Threshold

NPRI reporting on dioxins and furans does not depend on the amounts manufactured, processed or otherwise used, or the amounts released or transferred off-site. That is, all amounts are reportable from specified processes or activities. However, if the level is below typical method detection limits, the facility can indicate that the release is less than the level of quantification and not report an amount.

For TRI, the reporting threshold is 0.1 grams per year, based on the total grams of the 17 congeners. This threshold applies to each of the amounts manufactured, processed or otherwise used. "Manufacturing" includes coincidental manufacture as a byproduct or impurity. "Processing or otherwise used" applies to dioxins and furans that are present as contaminants in a chemical or that are created during the manufacture of that chemical.

Industry Sectors Required to Report

NPRI requires facilities with 10 or more employees to report on dioxins and furans only for specific listed activities. If a facility does not engage in a listed activity, it does not have to report on dioxins and furans. For some activities—wood preservation using pentachlorophenol and incineration—the employee threshold does not apply.

For TRI, all facilities with 10 or more employees that are required to report to TRI are also required to report on dioxins and furans if they meet the reporting threshold of 0.1 grams. Thus, manufacturing-sector facilities, electric utilities, hazardous waste management and solvent recovery facilities, petroleum bulk terminals, chemicals wholesalers, and metal and coal mines are all required to report dioxins and furans.

This is one of the main differences between NPRI and TRI reporting. TRI requires all facilities within the TRI industry sectors to report, while NPRI only requires a subset of all facilities to report, albeit from more industry sectors.

Table 10–28. TRI Dioxin/Furan Reporting Requirements

Reporting Threshold: 0.1 grams
Employee Threshold: 10 employees
Amounts reported in grams
Distribution of congeners also reported
Industrial Activities: reporting for all activities for certain industry sectors

US SIC Code	Industry Sectors Required to Report	Industry Sectors Reporting Releases and Transfers, 2002
10	Metal Mining	X
12	Coal Mining	X
20	Food Products	X
21	Tobacco Products	X
22	Textile Mill Products	X
23	Apparel and Other Textile Products	
24	Lumber and Wood Products	X
25	Furniture and Fixtures	X
26	Paper Products	X
27	Printing and Publishing	
28	Chemicals	X
29	Petroleum and Coal Products	X
30	Rubber and Plastics Products	X
31	Leather Products	
32	Stone/Clay/Glass Products	X
33	Primary Metals	X
34	Fabricated Metals Products	
35	Industrial Machinery	
36	Electronic/Electrical Equipment	
37	Transportation Equipment	X
38	Measurement/Photographic Instruments	X
39	Misc. Manufacturing Industries	
491/493	Electric Utilities	X
495/738	Hazardous Waste Mgt./Solvent Recovery	X
5169	Chemical Wholesalers	X
5171	Petroleum Bulk Terminals	X

Table 10–29. Facilities Reporting Dioxins/Furans, TRI and NPRI, 2002

US SIC Code	Industry	US TRI – for facilities meeting reporting threshold of 0.1 grams or more and 10 employees or more: Number of Facilities Reporting to TRI	Number of TRI Facilities Reporting Dioxins/Furans: Number of Facilities	Number of TRI Facilities Reporting Dioxins/Furans: % of Industry Total	Canadian NPRI – for facilities conducting certain activities meeting threshold of 10 employees or more except for wood preservation or incineration: Number of Facilities Reporting to NPRI	Number of NPRI Facilities Reporting Dioxins/Furans: Number of Facilities	Number of NPRI Facilities Reporting Dioxins/Furans: % of Industry Total
	Manufacturing Industry Sectors						
20	Food Products	1,694	25	1	146	0	0
21	Tobacco Products	31	1	3	1	0	0
22	Textile Mill Products	262	2	0.8	24	0	0
23	Apparel	18	0	0	3	0	0
24	Lumber and Wood Products	1,010	126	12	203	95	47
25	Furniture and Fixtures	259	8	3	54	4	7
26	Paper Products	468	153	33	153	52	34
27	Printing	215	0	0	38	0	0
28	Chemicals	3,573	131	4	462	10	2
29	Petroleum and Coal Products	543	61	11	37	0	0
30	Rubber and Plastics Products	1,821	2	0.1	226	0	0
31	Leather Products	50	0	0	2	0	0
32	Stone/Clay/Glass Products	1,082	95	9	119	17	14
33	Primary Metals	1,877	123	7	205	55	27
34	Fabricated Metals Products	2,901	0	0	292	3	1
35	Industrial Machinery	1,126	0	0	65	0	0
36	Electronic/Electrical Equipment	1,654	0	0	68	1	1
37	Transportation Equipment	1,346	4	0.3	188	1	1
38	Measurement/Photographic Instruments	374	1	0.3	7	0	0
39	Misc. Manufacturing Industries	296	0	0	141	5	4
--	Multiple codes 20–39*	1,271	43	3	--	--	--
	Other Industry Sectors						
02	Agricultural Production	NA			2	1	50
07	Agricultural Services	NA			4	1	25
09	Fishing, Hunting, Trapping	NA			1	1	100
10	Metal Mining**	79	10	13	48	2	4
1094	Uranium Mines	NA			5	1	20
12	Coal Mining	85	1	1	2	0	0
13	Oil and Gas Extraction	NA			138	1	1
14	Nonmetallic Minerals Mining	NA			18	1	6
16	Heavy Construction, except Building	NA			12	1	8
49	Sewerage Systems	NA			158	11	7
491/493	Electric Utilities	693	452	65	43	30	70
495/738	Hazardous Waste Mgt./Solvent Recovery	230	16	7	59	7	12
5169	Chemical Wholesale Distributors	456	1	0.2	7	0	0
5171	Petroleum Bulk Terminals/Bulk Storage	600	1	0.2	67	0	0
80	Health and Allied Services	NA			10	5	50
82	Educational Services	NA			1	1	100
89	Other Scientific & Technical Services	NA			11	1	9
95	Air, Water & Solid Waste Management	NA			88	38	43
97	National Security and International Affairs	NA			31	1	3
--	No codes 20–39***	365	8	2	--	--	--
	Other Industry Sectors with no NPRI reporting on Dioxins	--	--	--	121	0	0
	Total	**24,379**	**1,264**	**5**	**3,260**	**346**	**11**

NA = Not applicable (Sector not required to report).

* Multiple SIC codes reported only in TRI.

** Metal mining sector reports chemicals in waste rock in TRI but not in NPRI.

*** Includes US federal facilities and US facilities reporting no SIC code or an invalid SIC code.

10.4.2 Releases and Transfers of Dioxins and Furans from Industrial Sources, NPRI and TRI, 2000–2002

Facilities Reporting, 2002

- For the 2002 reporting year, 1,264 TRI facilities and 346 NPRI facilities reported on dioxins and furans—about 5 percent of all TRI facilities and about 11 percent of NPRI facilities. Almost two-thirds or more of TRI and NPRI electric utilities reported and about one-third of pulp and paper facilities in each country reported. Sectors with a higher percentage reporting to NPRI than to TRI included lumber and wood products, primary metals, stone/clay/glass products, and hazardous waste management facilities. Sectors with lower reporting to NPRI than to TRI include the chemical sector and petroleum and coal products.
- In NPRI, 43 percent of the facilities in the air, water and solid waste management sector reported on dioxins and furans. These include municipal waste incinerators, which are not required to report to TRI.

TRI Reporting on Dioxins and Furans

For the year 2002, 1,264 TRI facilities reported releasing 140,292 grams of dioxins and furans. Of these facilities, 906 reported their distribution of the 17 congeners. These 906 facilities reported 137,654 grams of dioxins and furans, or 98 percent of the total grams reported. With the distribution, a value for grams-iTEQ can be calculated. The facility is asked to provide the distribution for total releases or the best one–medium-specific distribution. The TRI form does not indicate to which it applies so, for *Taking Stock*, the distribution has been applied to total releases at the facility. The 906 facilities, then, released on and off-site the equivalent of 928 grams-iTEQ of dioxins and furans in 2002.

- The industry with the largest amounts of releases of dioxins and furans (grams-iTEQ) was the chemical sector, with 606 grams-iTEQ. The chemical sector accounted for about two-thirds of the total releases reported to TRI. These chemical manufacturers reported a decrease in total releases of dioxins and furans of 12 percent, or 83 grams-iTEQ, from 2000 to 2002.
- The primary metals sector reported the second-largest amounts of dioxins and furans in 2002, with 200 grams-iTEQ. These facilities reported an overall decrease of 6 percent, or 12 grams-iTEQ, from 2000 to 2002.
- The paper products sector reported the third-largest amounts of dioxins and furans in 2002, with 41 grams-iTEQ. The paper sector also had the largest increase in releases of dioxins and furans from 2000 to 2002, an increase of 26 grams-iTEQ or 176 percent.
- Electric utilities reported the fourth-largest amount in 2002, with 27 grams-iTEQ. This sector reported a decrease of 71 percent or 65 grams-iTEQ. One facility, Northern States Power Co. in Becker, Minnesota, had a decrease of 60 grams-iTEQ. This facility actually increased the grams of dioxins and furans it reported from 2000 to 2002

Table 10–30. Total Releases On-site and Off-site of Dioxins/Furans in Grams-iTEQ, TRI, 2000–2002 (Ordered by Grams-iTEQ, 2002)

		2000		2001		2002			Change 2000–2002		
		Forms with Dioxins/Furans Distribution		Forms with Dioxins/Furans Distribution		Forms with Dioxins/Furans Distribution			Forms with Dioxins/Furans Distribution		
							Total Reported Releases On- and Off-site			Total Reported Releases On- and Off-site	
US SIC Code	Industry	Number of Facilities	Total Reported Releases On- and Off-site (Grams-iTEQ*)	Number of Facilities	Total Reported Releases On- and Off-site (Grams-iTEQ*)	Number of Facilities	Grams-iTEQ*	% of Total	Number of Facilities	Grams-iTEQ*	%
28	Chemicals	99	689.34	100	738.35	97	605.96	65.3	-2	-83.37	-12.1
33	Primary Metals	85	212.18	80	201.02	78	200.30	21.6	-7	-11.88	-5.6
26	Paper Products	141	15.00	145	28.17	142	41.36	4.5	1	26.36	175.7
491/493	Electric Utilities	318	91.94	364	105.87	350	26.98	2.9	32	-64.96	-70.7
25	Furniture and Fixtures	0	0	6	11.53	3	15.70	1.7	3	15.70	--
495/738	Hazardous Waste Mgt./Solvent Recovery	10	12.03	9	10.78	10	12.98	1.4	0	0.95	7.9
32	Stone/Clay/Glass Products	57	17.53	50	11.24	56	10.05	1.1	-1	-7.48	-42.7
24	Lumber and Wood Products	68	1.97	81	6.93	82	8.30	0.9	14	6.33	320.6
--	Multiple codes 20–39**	31	13.35	30	4.56	31	3.30	0.4	0	-10.05	-75.3
29	Petroleum and Coal Products	23	2.93	24	1.03	24	1.55	0.2	1	-1.38	-47.1
10	Metal Mining	11	0.91	10	0.95	9	0.95	0.1	-2	0.04	4.6
20	Food Products	16	0.42	16	0.34	17	0.40	0.04	1	-0.02	-3.9
38	Measurement/Photographic Instruments	1	0.18	1	0.42	1	0.37	0.04	0	0.19	102.8
37	Transportation Equipment	3	0.12	2	0.04	3	0.05	0.01	0	-0.07	-60.3
--	No codes***	2	0.05	1	0.03	1	0.05	0.01	-1	-0.01	-13.6
5169	Chemical Wholesalers	1	0.01	1	0.02	1	0.01	0.001	0	0.00	24.4
22	Textile Mill Products	0	0.00	0	0.00	1	0.01	0.001	1	0.01	--
34	Fabricated Metals Products	1	0.03	0	0.00	0	0.00	0.0	-1	-0.03	-100.0
5171	Petroleum Bulk Terminals	1	2.69	0	0.00	0	0.00	0.0	-1	-2.69	-100.0
	Total	**868**	**1,060.69**	**920**	**1,121.29**	**906**	**928.33**	**100.0**	**38**	**-132.36**	**-12.5**

* Grams-iTEQ calculated from reported weight, congener distribution, and toxic equivalency factors developed by international convention adopted in 1989.
** Multiple SIC codes reported only in TRI.
*** Includes US Federal Facilities and US facilities reporting no SIC code or an invalid SIC code.

Table 10–31. TRI Facilities with Largest Releases On- and Off-site of Dioxins/Furans (Grams-iTEQ) in 2002, 2000–2002

Rank	Facility	City, State	US SIC Codes	Facility Probably not Required to Report to NPRI (based on US SIC Code)	Total Reported Releases On- and Off-site: 2000 (Grams-iTEQ*)	2001 (Grams-iTEQ*)	2002 (Grams-iTEQ*)	Change 2000–2002 (Grams-iTEQ*)
1	Oxy Vinyls L.P. La Porte VCM Plant, Occidental Petroleum Corp.	La Porte, TX	2869		162.12	172.82	171.70	9.58
2	DuPont Edgemoor	Edgemoor, DE	2816	X	96.30	137.54	116.63	20.34
3	Dow Chemical Co. Freeport Facility	Freeport, TX	2813 2812 2891 2869 2821 2819		71.08	221.27	91.90	20.82
4	DuPont Delisle Plant	Pass Christian, MS	2816	X	82.70	77.22	85.18	2.48
5	DuPont Johnsonville Plant	New Johnsonville, TN	2816	X	71.32	38.33	35.35	-35.97
6	Solutia Inc.	Decatur, AL	2824 2869		0.04	0.04	27.14	27.10
7	Imco Recycling Inc.	Morgantown, KY	3341		24.66	24.62	24.81	0.15
8	USS Gary Works, US Steel Corp.	Gary, IN	3312		2.58	17.21	24.32	21.75
9	Weyerhaeuser Co. Pulp Paper & Packaging Facility	Plymouth, NC	2611 2631 2621		0.00	0.00	20.72	20.72
10	Dow Chemical Co., Midland Ops.	Midland, MI	2869 4953 2879 2834 2821 2819		12.87	13.99	16.29	3.41
11	Wabash Alloys L.L.C., Connell L.P.	Wabash, IN	3341		12.05	11.75	15.52	3.46
12	Imco Recycling of Ohio Inc.	Uhrichsville, OH	3341		16.37	15.51	14.45	-1.92
13	Westlake Vinyls Inc., Westlake Chemical Corp.	Calvert City, KY	2869 2812		0.00	1.47	12.06	12.06
14	Formosa Plastics Corp. Louisiana	Baton Rouge, LA	2821 2869 2812		7.47	8.67	10.41	2.93
15	Bethlehem Steel Corp., Sparrows Point Div.	Sparrows Point, MD	3312 3316		10.81	10.40	10.39	-0.42
16	Ormet Aluminum Mill Prods. Corp.	Friendly, WV	3341		10.78	8.06	10.29	-0.49
17	Clean Harbors Buttonwillow L.L.C.	Buttonwillow, CA	4953		0.02	0.01	10.07	10.04
18	Bethlehem Steel Corp., Burns Harbor Div.	Burns Harbor, IN	3312		8.95	8.49	8.16	-0.78
19	Northern States Power Co.	Becker, MN	4911		68.33	86.31	7.91	-60.43
20	Kerr-McGee Pigments (Savannah) Inc., Kerr-McGee Corp.	Savannah, GA	2816 2819		4.40	5.81	7.14	2.73
21	Colfax Treating Co. L.L.C., Roy O. Martin Lumber Co. L.L.C.	Pineville, LA	2491		0.00	0.00	7.04	7.04
22	American Drew Plant 13130130	North Wilkesboro, NC	2511		0.00	3.90	6.80	6.80
23	US Magnesium L.L.C., Renco Group Inc.	Rowley, UT	3339		13.87	13.12	6.69	-7.18
24	Imco Recycling of Michigan L.L.C.	Coldwater, MI	3341		6.41	6.25	6.43	0.02
25	Alchem Aluminum Inc., Imco Recycling Inc.	Coldwater, MI	3341		7.14	6.14	6.39	-0.75
	Subtotal				**690.27**	**888.92**	**753.78**	**63.51**
	% of Total				**65**	**79**	**81**	
	Total				**1,060.69**	**1,121.29**	**928.33**	**-132.36**

* Grams-iTEQ calculated from reported weight, congener distribution, and toxic equivalency factors developed by international convention adopted in 1989.

(as disposal in on-site landfill in both years), but changed the distribution of congeners, leading to a decrease in grams-iTEQ.

- The facility with the largest reported amounts of dioxins and furans (grams-iTEQ) was the Oxy Vinyls L.P. La Porte VCM Plant in La Porte, Texas. This chemical manufacturer reported the equivalent of almost 172 grams-iTEQ—more than 18 percent of the TRI total. This facility also showed an increase in its releases of dioxins and furans of almost 10 grams-iTEQ over 2000 amounts.
- The DuPont Edgemoor facility in Edgemoor, Delaware, reported the second-largest amount of dioxins and furans in 2002, the equivalent of almost 117 grams-iTEQ, or 13 percent of the TRI total. This facility showed an increase of 20 grams-iTEQ from 2000 to 2002.
- The 25 facilities with the largest releases (grams-iTEQ) in 2002 accounted for 81 percent of total releases of dioxins and furans reported to TRI. The top four facilities accounted for half of the total. Ten of these facilities were chemical manufacturers, mainly of inorganic pigments (US SIC 2816), and ten were primary metals manufacturers with six secondary smelters of nonferrous metals (US SIC 3341).

NPRI Reporting on Dioxins and Furans

In 2002, 346 facilities reported total releases of 239 grams-iTEQ of dioxins and furans to NPRI.

- The paper products industry in NPRI reported the largest total releases (grams-iTEQ) of dioxins and furans in 2002 and in 2000. These facilities reported 72 grams-iTEQ in 2002, a decrease of 40 percent from 2000. Three facilities accounted for reductions of 52 grams-iTEQ. They reported research into ways to reduce emissions. The Norske Skog Canada Limited (NorskeCanada), Powell River, British Columbia, has reduced emissions through a fuel exchange with a sister facility that operates a wet scrubber as a pollution control device. The Howe Sound Pulp and Paper LP owned by Canadian Forest Products and Oji Paper Canada, located in Port Mellon, British Columbia, continues to investigate non-salty wood alternatives as a fuel source for their boiler. The Norske Skog Canada Limited facility in Port Alberni, British Columbia, has conducted research trials using flue gas quenching to reduce emissions.
- The primary metals industry in NPRI reported the second-largest releases of dioxins and furans, with 61 grams-iTEQ in 2002, a decrease of 48 percent from 2000. Two Wabash Alloys facilities (located in Guelph and Mississauga, Ontario) accounted for reductions of over 54 grams-iTEQ. They cited changes in measurement test results as the reason for the change.
- The air, water and solid waste management sector (municipal waste incinerators) reported the third-largest releases, with almost 47 grams-iTEQ, a decrease of 12 percent from 2000. This sector is not required to report to TRI.
- Sewerage systems (which do not report to TRI) reported the fourth-largest releases of dioxins and furans in 2002, with 29 grams-iTEQ in 2002. This sector reported 8.6 grams-iTEQ in 2000,

Table 10–32. Total Releases On- and Off-site of Dioxins/Furans by Industry, NPRI, 2000–2002 (Ordered by Total Grams-iTEQ, 2002)

		2000		2001		2002			Change 2000–2002		
US SIC Code	Industry	Number of Facilities	Total Reported Releases On- and Off-site (Grams-iTEQ*)	Number of Facilities	Total Reported Releases On- and Off-site (Grams-iTEQ*)	Number of Facilities	Total Reported Releases On- and Off-site Grams-iTEQ*	% of Total	Number of Facilities	Total Reported Releases On- and Off-site Grams-iTEQ*	%
26	Paper Products	52	120.65	55	140.49	52	72.26	30	0	-48.39	-40
33	Primary Metals	52	119.06	55	56.32	53	61.35	26	1	-57.71	-48
95	Air, Water & Solid Waste Management**	41	53.10	38	47.47	38	46.77	20	-3	-6.33	-12
49	Sewerage Systems**	10	8.64	12	34.69	5	29.05	12	-5	20.41	236
491/493	Electric Utilities	31	4.46	31	4.83	34	16.16	7	3	11.70	262
28	Chemicals***	9	35.67	10	66.91	10	7.58	3	1	-28.09	-79
39	Misc. Manufacturing Industries	2	0.00	3	0.00	5	1.50	0.6	3	1.50	--
24	Lumber and Wood Products	66	4.62	89	4.99	96	1.34	0.6	30	-3.28	-71
32	Stone/Clay/Glass Products	14	1.85	15	0.91	17	1.08	0.5	3	-0.77	-42
495/738	Hazardous Waste Mgt./Solvent Recovery	4	1.26	6	1.23	8	1.06	0.4	4	-0.20	-16
25	Furniture and Fixtures	0	0.00	2	0.00	4	0.30	0.1	4	0.30	--
36	Electronic/Electrical Equipment	1	0.00	1	0.00	1	0.19	0.1	0	0.19	--
80	Health and Allied Services**	2	0.00	3	0.33	6	0.17	0.1	4	0.17	--
34	Fabricated Metals Products	3	0.05	3	0.04	3	0.04	0.02	0	-0.01	-20
1094	Uranium Mines**	1	0.00	1	0.00	3	0.01	0.004	2	0.01	--
37	Transportation Equipment	2	0.00	0	0.00	1	0.01	0.004	-1	0.01	--
02	Agricultural Production**	0	0.00	0	0.00	1	0.00	0	1	0.00	--
07	Agricultural Services**	0	0.00	0	0.00	1	0.00	0	1	0.00	--
09	Fishing, Hunting, Trapping**	1	0.00	1	0.00	1	0.00	0	0	0.00	--
10	Metal Mining	2	0.00	2	0.00	2	0.00	0	0	0.00	--
13	Oil and Gas Extraction**	2	0.00	2	0.00	1	0.00	0	-1	0.00	--
14	Nonmetallic Minerals Mining**	0	0.00	1	0.00	1	0.00	0	1	0.00	--
16	Heavy Construction, except Building**	1	0.00	1	0.00	0	0.00	0	-1	0.00	--
20	Food Products	1	0.00	1	0.00	0	0.00	0	-1	0.00	--
35	Industrial Machinery	1	0.00	0	0.00	0	0.00	0	-1	0.00	--
47	Transportation Services**	1	0.00	1	0.00	0	0.00	0	-1	0.00	--
82	Educational Services**	0	0.00	0	0.00	1	0.00	0	1	0.00	--
89	Other Scientific & Technical Services**	1	0.01	1	0.00	1	0.00	0	0	-0.01	-100
97	National Security and International Affairs**	0	0.00	0	0.00	1	0.00	0	1	0.00	--
	Total	**300**	**349.37**	**334**	**358.21**	**346**	**238.87**	**100**	**46**	**-110.50**	**-32**

Note: Only certain activities within these industries must be reported under NPRI.

* Grams-iTEQ as reported are based on toxic equivalency factors developed by international convention adopted in 1989.

** Only manufacturers of chlorinated organic solvents or chlorinated monomers are required to report dioxins/furans to NPRI.

*** Industry not required to report to TRI.

Table 10–33. NPRI Facilities with Largest Releases On- and Off-site of Dioxins/Furans (Grams-iTEQ) in 2002, 2000–2002

Rank	Facility	City, Province	SIC Code Canada	SIC Code US	Facility Probably not Required to Report to TRI (based on US SIC Code)	Activity Reported	Total Reported Releases On- and Off-site 2000 Grams-iTEQ*	2001 Grams-iTEQ*	2002 Grams-iTEQ*	Change 2000-2002 Grams-iTEQ*
1	Ville de Québec, Incinérateur	Québec, QC	4999	4961	X	Non-hazardous solid waste incineration, Sewage sludge incineration	1.70	23.08	28.94	27.24
2	Howe Sound Pulp and Paper LP, Canadian Forest Products/Oji Paper Canada	Port Mellon, BC	2711	2611		Combustion of fuel in kraft liquor boilers in pulp and paper sector	36.57	25.87	23.99	-12.58
3	Norske Skog Canada Limited, Port Alberni Division	Port Alberni, BC	2712	2621		Combustion of salt-laden logs in pulp and paper sector	40.86	35.96	19.24	-21.62
4	Wabash Alloys, Wabash Alloys Mississauga	Mississauga, ON	2999	3341		Smelting of secondary aluminum	53.53	9.20	13.23	-40.30
5	Norske Skog Canada Limited, Crofton Division	Crofton, BC	2711	2611		Combustion of fossil fuel in boiler to produce electricity, Combustion of salt-laden logs, Combustion of fuel in kraft liquor boilers in pulp and paper sector	3.89	5.68	11.39	7.50
6	IPSCO Saskatchewan Inc., Regina Plant Site, IPSCO Inc.	Regina, SK	2912	3324		Operation of electric arc furnaces in steel manufacturing	1.65	9.25	11.30	9.65
7	Wabash Alloys, Wabash Alloys Guelph	Guelph, ON	2999	3341		Smelting of secondary aluminum	25.06	7.02	11.11	-13.95
8	City of Hamilton, SWARU Incinerator	Hamilton, ON	4911	4911		Non-hazardous solid waste incineration	5.49	10.04	10.34	4.85
9	Grand Falls-Windsor, Exploits Regional Services Board, Solid Waste Disposal Site	Grand Falls-Windsor, NL	8373	9511	X	Non-hazardous solid waste incineration	8.01	8.01	8.01	0.00
10	Altasteel Ltd., Stelco Inc.	Edmonton, AB	2919	3312		Operation of electric arc furnaces in steel manufacturing	10.59	10.79	7.18	-3.41
11	Dow Chemical Canada Incorporated, Western Canada Operations	Fort Saskatchewan, AB	3711	2812		Production of chlorinated organic solvents or monomers	35.53	66.19	6.52	-29.01
12	Pope & Talbot Ltd., Harmac Pulp Operations	Nanaimo, BC	2711	2611		Combustion of salt-laden logs, Combustion of fuel in kraft liquor boilers in pulp and paper sector	6.95	6.27	6.06	-0.89
13	NorskeCanada, Elk Falls Division	Campbell River, BC	2712	2621		Combustion of salt-laden logs, Combustion of fuel in kraft liquor boilers in pulp and paper sector	3.71	37.67	5.88	2.17
14	Gerdau AmeriSteel, MRM Special Sections	R.M of St. Andrews, MB	2919	3312		Operation of electric arc furnaces in steel manufacturing	4.31	6.61	5.50	1.19
15	Harbour Grace, Conception Bay North Incinerator Association	Harbour Grace, NL	8373	9511	X	Non-hazardous solid waste incineration	9.29	5.26	4.78	-4.51
16	Métallurgie Magnola Inc., Noranda Inc./ Société générale de finacement du Québec	Danville, QC	2959	3339		Production of magnesium	0.01	0.65	3.69	3.68
17	Town of Wabush, Incinerator	Wabush, NL	8373	9511	X	Non-hazardous solid waste incineration	3.52	3.52	3.52	0.00
18	Town of Marystown, Waste Disposal Site Jean de Baie	Marystown, NL	8373	9511	X	Non-hazardous solid waste incineration	3.26	3.26	3.26	0.00
19	Town of Holyrood, Incinerator	Holyrood, NL	8373	9511	X	Non-hazardous solid waste incineration	2.58	2.58	2.58	0.00
20	Town of Channel - Port aux Basques, Incinerator	Port Aux Basques, NL	8373	9511	X	Non-hazardous solid waste incineration	2.56	2.56	2.56	0.00
21	Town of Deer Lake, Incinerator	Deer Lake, NL	8373	9511	X	Non-hazardous solid waste incineration	2.56	2.56	2.56	0.00
22	Town of Stephenville, Incinerator	Stephenville, NL	8373	9511	X	Non-hazardous solid waste incineration	2.21	2.21	2.21	0.00
23	Western Pulp Limited Partnership, Doman Industries	Squamish, BC	2711	2611		Combustion of fuel in kraft liquor boilers in pulp and paper sector	2.46	5.02	2.14	-0.32
24	Norske Skog Canada Limited (NorskeCanada), Powell River Division	Powell River, BC	2712	2621		Non-hazardous solid waste incineration, Combustion of salt-laden logs in pulp and paper sector	19.75	13.34	1.91	-17.84
25	Town of Clarenville, Incinerator	Clarenville, NL	8373	9511	X	Non-hazardous solid waste incineration	1.84	1.84	1.84	0.00
	Subtotal						**287.89**	**304.44**	**199.74**	**-88.15**
	% of Total						**82**	**85**	**84**	
	Total						**349.37**	**358.21**	**238.87**	**-110.50**

* Grams-iTEQ as reported are based on toxic equivalency factors developed by international convention adopted in 1989.

resulting in an increase of more than 200 percent. The increase occurred in 2001; this sector reported a decrease of 5.6 grams-iTEQ, or 16 percent, from 2001 to 2002.

- Electric utilities reported the fifth-largest releases of dioxins and furans in 2002, with 16 grams-iTEQ. This sector increased its releases by 12 grams-iTEQ, or 262 percent, from 2000 to 2002.
- The NPRI facility reporting the largest releases of dioxins and furans was the incinerator operated by the municipality of Quebec City, Quebec. It reported almost 29 grams-iTEQ in 2002. It had reported just 1.7 grams-iTEQ in 2000.
- The pulp and paper mill Howe Sound Pulp and Paper LP owned by Canadian Forest Products and Oji Paper Canada, located in Port Mellon, British Columbia, reported the second-largest releases, reporting 24 grams-iTEQ from the combustion of salt-laden logs and spent kraft pulping liquor in its kraft boiler. This mill, as well as others among the top 25, reported that it is a partner in a working group of coastal pulp and paper mills investigating the generation of dioxins and furans from power boilers burning salt-laden logs as fuel in conjunction with the Pulp and Paper Research Institute of Canada. The purpose of the study is to determine the factors that contribute to the formation of dioxins and furans in these boilers and to develop control technologies or strategies to reduce the releases of these compounds. Howe is also investigating non-salty wood alternatives as a fuel source for its boiler.
- The 25 facilities with the largest releases on- and off-site (grams-iTEQ) in 2002 accounted for 84 percent of total releases of dioxins and furans reported to NPRI.

10.5 Hexachlorobenzene

Hexachlorobenzene is a persistent, bioaccumulative toxic and a probable carcinogen. In Canada, it is a CEPA toxic and slated for virtual elimination of releases to the environment. It stays in the atmosphere a long time and can be transported long distances. Human exposure occurs mainly through eating contaminated fish and plants or breathing it in urban air.

Starting with the 2000 reporting year, NPRI required the reporting of hexachlorobenzene (HCB) and TRI lowered the threshold for this chemical. Direct comparison of the data on hexachlorobenzene is not possible. HCB is on the list of chemicals to be reported under the RETC program.

10.5.1 Reporting Requirements

NPRI requires facilities with 10 or more employees to report on hexachlorobenzene only for specific listed activities. If a facility does not engage in a listed activity, it does not have to report on HCB. For several activities (wood preserving using pentachlorophenol and incineration) the employee threshold of 10 or more employees does not apply. The listed activities are the same as those for dioxins and furans (see **Table 10–27**).

NPRI reporting on hexachlorobenzene does not depend on the amounts manufactured, processed or otherwise used, or the amounts released or transferred off-site. That is, all amounts are reportable. However, if the level is below typical method detection limits, the facility can indicate that the release is less than the level of quantification and not report an amount, or facilities may indicate that no information is available on which to base an estimate. Over 61 percent (209 of the 342 facilities) of the facilities reporting hexachlorobenzene did not report an amount. There were 137 of the 209 facilities indicating they lacked information for making an estimate of on-site releases and 23 facilities indicating their measurements were below the level of quantification. The rest indicated that the release type was not applicable to their facility.

For TRI, the reporting threshold is 10 lbs (4.5 kg). This threshold applies to each of the amounts manufactured, processed or otherwise used. All facilities with 10 or more employees that are required to report to TRI for any listed substance are required to report on hexachlorobenzene. Thus, manufacturing sector facilities, electric utilities, hazardous waste management/solvent recovery facilities, petroleum bulk terminals, chemicals wholesalers, and metal and coal mines are all required to report.

10.5.2 Releases and Transfers of Hexachlorobenzene from Industrial Sources, NPRI and TRI, 2000–2002

Facilities Reporting, 2002

The difference in reporting requirements for the various industry sectors resulted in quite different reporting under TRI and NPRI.

- Less than 0.5 percent of all TRI facilities reported on HCB, compared to 10 percent of NPRI facilities. However, many NPRI facilities, while submitting a form for HCB, did not report any amounts for releases and transfers of HCB. Only 4 percent (133 NPRI facilities) reported non-zero amounts of releases or transfers of HCB for 2002.
- Over 43 percent of the TRI facilities reporting releases and transfers of hexachlorobenzene were in the chemical manufacturing sector (26 out of 60 facilities). Only chemical manufacturers of chlorinated organic solvents or chlorinated monomers are required to report to NPRI.
- The hazardous waste management sector had 17 TRI facilities reporting, and nine electric utilities reported. These two sectors, along with the chemical industry, accounted for 87 percent of all TRI facilities reporting releases and transfers of hexachlorobenzene.
- In NPRI, the top sectors reporting releases and transfers of hexachlorobenzene were somewhat different than TRI. The air, water and solid waste management sector had the largest number of facilities reporting releases and transfers of hexachlorobenzene, with 35 facilities. These are municipal waste incinerators, which are not required to report to TRI. The primary metals sector had the second-largest number of NPRI facilities reporting, with 19 facilities, and electric utilities were third with 17 facilities. These three sectors accounted for over half of all NPRI facilities reporting releases and transfers of hexachlorobenzene for 2002.

Table 10–34. Facilities Reporting Hexachlorobenzene, TRI and NPRI, 2002

		US TRI - for facilities meeting reporting threshold of 0.1 grams or more and 10 employees or more				Canadian NPRI - for facilities conducting certain activities meeting threshold of 10 employees or more except for wood preservation or incineration			
			Number of TRI Facilities Reporting Hexachlorobenzene				Number of NPRI Facilities Reporting Hexachlorobenzene		
US SIC Code	Industry	Number of Facilities Reporting to TRI	Number of Facilities	% of Industry Total	Number of Facilities Reporting Releases and Transfers of Hexachlorobenzene	Number of Facilities Reporting to NPRI	Number of Facilities	% of Industry Total	Number of Facilities Reporting Releases and Transfers of Hexachlorobenzene
	Manufacturing Industry Sectors								
20	Food Products	1,694				146			
21	Tobacco Products	31				1			
22	Textile Mill Products	262				24			
23	Apparel	18				3			
24	Lumber and Wood Products	1,010	21	2	1	203	94	46	16
25	Furniture and Fixtures	259				54	4	7	1
26	Paper Products	468				153	51	33	12
27	Printing	215				38			
28	Chemicals	3,573	34	1	26	462	9	2	4
29	Petroleum and Coal Products	543				37			
30	Rubber and Plastics Products	1,821	3	0.2	3	226			
31	Leather Products	50				2			
32	Stone/Clay/Glass Products	1,082	2	0.2	1	119	17	14	12
33	Primary Metals	1,877	3	0.2	3	205	54	26	19
34	Fabricated Metals Products	2,901				292	3	1	0
35	Industrial Machinery	1,126				65			
36	Electronic/Electrical Equipment	1,654				68	1	1	0
37	Transportation Equipment	1,346				188	1	1	0
38	Measurement/Photographic Instruments	374				7			
39	Misc. Manufacturing Industries	296				141	5	4	1
--	Multiple codes 20–39*	1,271				--			
	Other Industry Sectors								
02	Agricultural Production	NA				2	1	50	0
07	Agricultural Services	NA				4	1	25	0
09	Fishing, Hunting, Trapping	NA				1	1	100	1
10	Metal Mining**	79				48	3	6	1
1094	Uranium Mines	NA				5	1	20	0
12	Coal Mining	85				2			
13	Oil and Gas Extraction	NA				138	1	1	0
14	Nonmetallic Minerals Mining	NA				18	1	6	1
16	Heavy Construction, except Building	NA				12	1	8	0
49	Sewerage Systems	NA				158	10	6	6
491/493	Electric Utilities	693	9	1	9	43	30	70	17
495/738	Hazardous Waste Mgt./Solvent Recovery	230	21	9	17	59	7	12	4
5169	Chemical Wholesale Distributors	456	1	0.2	0	7			
5171	Petroleum Bulk Terminals/Bulk Storage	600				67			
80	Health and Allied Services	NA				10	5	50	3
82	Educational Services	NA				1	1	100	0
89	Other Scientific & Technical Services	NA				11	1	9	0
95	Air, Water & Solid Waste Management	NA				88	38	43	35
97	National Security and International Affairs	NA				31	1	3	0
--	No codes 20–39***	365				--	--	--	--
	Other Industry Sectors with no NPRI reporting on **Hexachlorobenzene**					121	--	--	--
	Total	**24,379**	**94**	**0.4**	**60**	**3,260**	**342**	**10**	**133**

NA = Not applicable (Sector not required to report).
* Multiple SIC codes reported only in TRI.
** Metal mining sector reports chemicals in waste rock in TRI but not in NPRI.
*** Includes US Federal Facilities and US facilities reporting no SIC code or an invalid SIC code.

TRI Releases and Transfers

- In 2002, TRI facilities reported 36,148 kg of total releases and transfers of hexachlorobenzene. This was a decrease of 46 percent from 2000.
- Total releases on- and off-site decreased by 7,736 kg (43 percent), with on-site land releases decreasing by 4,978 kg (48 percent). On-site air releases decreased by 388 kg or 43 percent. On-site surface water discharges increased by 30 kg (20 percent).
- Transfers off-site for energy recovery dropped dramatically, from almost 25,700 kg in 2000 to 957 kg in 2002. One TRI facility reported most of the transfers to energy recovery in both 2000 and 2002. The Amvac Chemical Corporation in Los Angeles, California, reported transferring 25,635 kg of HCB to energy recovery in 2000. In 2002, the facility transferred 892 kg to energy recovery. This facility makes agricultural chemicals, including pesticides.

Table 10–35. Summary of Total Reported Amounts of Releases and Transfers, TRI, Hexachlorobenzene, 2000–2002

	2000 Number	2001 Number	2002 Number	Change 2000–2002 Number	%
Total Facilities	100	98	94	-6	-6
Total Facilities Reporting Releases and Transfers	61	63	60	-1	-2
Releases On- and Off-site	**kg**	**kg**	**kg**	**kg**	**%**
On-site Releases	**11,371**	**11,369**	**6,018**	**-5,353**	**-47**
Air	904	544	516	-388	-43
Surface Water	150	146	180	30	20
Underground Injection	22	10	5	-17	-76
Land	10,295	10,669	5,317	-4,978	-48
Off-site Releases (Transfers off-site to disposal)	**6,464**	**8,196**	**4,081**	**-2,383**	**-37**
Total Reported Releases On- and Off-site	**17,835**	**19,565**	**10,100**	**-7,736**	**-43**
Off-site Transfers to Recycling	**6,087**	**649**	**430**	**-5,657**	**-93**
Other Off-site Transfers for Further Management	**42,955**	**16,114**	**25,619**	**-17,336**	**-40**
Energy Recovery	25,663	967	957	-24,705	-96
Treatment	17,288	15,137	24,655	7,368	43
Sewage	5	9	6	1	25
Total Reported Amounts of Releases and Transfers	**66,877**	**36,328**	**36,148**	**-30,729**	**-46**

Table 10–36. Total Releases On- and Off-site of Hexachlorobenzene, TRI, by Industry, 2000–2002 (Ordered by Total Releases, 2002)

		2000		2001		2002			Change 2000–2002		
US SIC Code	Industry	Number of Facilities	Total Reported Releases On- and Off-site (kg)	Number of Facilities	Total Reported Releases On- and Off-site (kg)	Number of Facilities	Total Reported Releases On- and Off-site kg	Total Reported Releases On- and Off-site % of Total	Number of Facilities	Total Reported Releases On- and Off-site kg	Total Reported Releases On- and Off-site %
28	Chemicals	28	9,178	25	8,997	26	6,324	63	-2	-2,854	-31
495/738	Hazardous Waste Mgt./Solvent Recovery	14	7,770	19	10,035	17	3,134	31	3	-4,635	-60
33	Primary Metals	4	294	5	347	3	417	4	-1	123	42
30	Rubber and Plastics Products	3	161	3	154	3	185	2	0	25	15
491/493	Electric Utilities	7	27	8	27	9	38	0.4	2	11	41
32	Stone/Clay/Glass Products	2	367	1	0.3	1	0.4	0.004	-1	-367	-100
24	Lumber and Wood Products	0	0	1	0.05	1	0.2	0.002	1	0	--
--	No codes 20–39*	2	32	1	5	0	0	0.0	-2	-32	-100
--	Multiple Codes 20–39**	1	7	0	0	0	0	0.0	-1	-7	-100
5169	Chemical Wholesalers	0	0	0	0	0	0	0.0	0	0	--
	Total	**61**	**17,835**	**63**	**19,565**	**60**	**10,100**	**100.0**	**-1**	**-7,736**	**-43**

* Includes US Federal Facilities and facilities reporting no SIC code or an invalid SIC code.
** Multiple SIC codes reported only in TRI.

Table 10–37. TRI Facilities with Largest Total Reported Amounts of Releases On- and Off-site of Hexachlorobenzene in 2002, 2000–2002

				2000		2001		2002		Change 2000–2002	
Rank	Facility	City, State	US SIC Codes	Number of Forms	Total Releases On- and Off-site (kg)	Number of Forms	Total Releases On- and Off-site (kg)	Number of Forms	Total Releases On- and Off-site (kg)	Number of Forms	Total Releases On- and Off-site (kg)
1	GB Biosciences Corp.	Houston, TX	2879 2819	1	5,482	1	6,157	1	2,717	0	-2,765
2	Chemical Waste Management Lake Charles Facility, Waste Management Inc.	Sulphur, LA	4953	1	4,989	1	3,402	1	2,404	0	-2,585
3	DuPont Delisle Plant	Pass Christian, MS	2816	1	1,465	1	1,354	1	1,398	0	-67
4	DuPont Edgemoor	Edgemoor, DE	2816	1	544	1	373	1	1,270	0	725
5	DuPont Johnsonville Plant	New Johnsonville, TN	2816	1	898	1	569	1	595	0	-303
	Subtotal			**5**	**13,378**	**5**	**11,855**	**5**	**8,383**	**0**	**-4,994**
	% of Total			**8**	**75**	**8**	**61**	**8**	**83**		
	Total			**61**	**17,835**	**63**	**19,565**	**60**	**10,100**	**-1**	**-7,736**

- The TRI chemical manufacturing industry reported the largest releases on- and off-site in 2002, with 6,324 kg, or 63 percent of the total. This sector reported a decrease of 31 percent from 2000 to 2002. The TRI facility with the largest reported releases on- and off-site of hexachlorobenzene in 2002 was the chemical manufacturer GB Biosciences Corp. in Houston, Texas, with 2,717 kg, a decrease of 2,765 kg from 2000 to 2002, mainly as transfers to disposal. This facility makes agricultural and industrial inorganic chemicals.
- The hazardous waste management sector reported the second-largest releases, with 3,134 kg in 2002, a decrease of 60 percent from 2000. One facility, Chemical Waste Management in Sulphur, Louisiana, reported 2,404 kg disposed of in on-site landfills. The facility reported 2,585 kg less in 2002 than in 2000.
- The 5 TRI facilities with the largest reported releases and transfers accounted for 83 percent of the total releases on- and off-site of hexachlorobenzene in 2002.

NPRI Releases and Transfers

- In 2002, NPRI facilities reported 452 kg of total releases and transfers of hexachlorobenzene. This was an increase of more than 404 kg from 2000. The number of facilities reporting releases or transfers of HCB increased by 8 percent (10 facilities).
- On-site releases increased by 20 percent, with much of the increase as air emissions. Off-site releases also increased, by over 7 kg, from less than 0.3 kg in 2000. Total releases on- and off-site increased by 39 percent.
- Other off-site transfers for further waste management consisted of transfers to treatment, which went from 10 kg in 2000 to 400 kg in 2002. One facility, Métallurgie Magnola Inc., owned by Noranda Inc. and the Société générale de financement du Québec in Danville, Quebec, reported over 384 kg of hexachlorobenzene in 2002 in waste sent to the Swan Hills Special Waste Treatment Facility in Swan Hills, Alberta, for incineration. This facility also reported the largest releases of hexachlorobenzene in 2002, an increase of 98 percent from 2000, mainly as air releases.
- The primary metals sector in NPRI reported the largest amount of releases on- and off-site of hexachlorobenzene in 2002, with 29.5 kg, or over half of the total. This was an increase of almost 26 kg from 2000. Métallurgie Magnola Inc. (mentioned above), with 18 kg, and another Noranda facility, the Brunswick Smelter in Belledune, New Brunswick, with 5.8 kg, were the NPRI primary metals facilities reporting the largest releases of hexachlorobenzene for 2002.
- The electric utilities sector had the second-largest total releases on- and off-site in 2002, with 10.6 kg, which was a decrease of over 7 kg from 2000. The Sheerness Generating Station owned by ATCO Power and TransAlta Utilities, located in Hanna, Alberta, reported the largest releases of hexachlorobenzene of all NPRI electric utilities, with 2.15 kg

Table 10–38. Summary of Total Reported Amounts of Releases and Transfers, NPRI, Hexachlorobenzene, 2000–2002

	2000	2001	2002	Change 2000–2002	
	Number	Number	Number	Number	%
Total Facilities	300	328	342	42	14
Total Facilities Reporting Releases and Transfers	123	132	133	10	8
Releases On- and Off-site	**kg**	**kg**	**kg**	**kg**	**%**
On-site Releases	**37.26**	**43.02**	**44.90**	**7.64**	**20**
Air	37.09	40.65	44.55	7.46	20
Surface Water	0.17	0.004	0.01	-0.16	-93
Underground Injection	0.00	2.15	0.09	0.09	--
Land	0.00	0.22	0.25	0.25	--
Off-site Releases (Transfers off-site to disposal)	**0.24**	**7.41**	**7.25**	**7.01**	**2,917**
Total Reported Releases On- and Off-site	**37.51**	**50.43**	**52.15**	**14.65**	**39**
Off-site Transfers to Recycling	**0.05**	**0.14**	**0.09**	**0.04**	**93**
Other Off-site Transfers for Further Management	**10.26**	**20.91**	**400.12**	**389.87**	**3,801**
Energy Recovery	0.00	0.00	0.00	0.00	--
Treatment	10.21	20.78	400.03	389.82	3,818
Sewage	0.00001	0.00026	0.00000	-0.00001	-100
Total Reported Amounts of Releases and Transfers	**47.76**	**71.34**	**452.27**	**404.51**	**847**

Table 10–39. Total Releases On- and Off-site of Hexachlorobenzene, NPRI, by Industry, 2000–2002 (Ordered by Total Releases and Transfers, 2002)

		2000		2001		2002			Change 2000–2002		
US SIC Code	Industry	Number of Facilities Reporting Releases and Transfers	Total Reported Releases On- and Off-site (kg)	Number of Facilities Reporting Releases and Transfers	Total Reported Releases On- and Off-site (kg)	Number of Facilities Reporting Releases and Transfers	Total Reported Releases On- and Off-site kg	Total Reported Releases On- and Off-site % of Total	Number of Facilities Reporting Releases and Transfers	Total Reported Releases On- and Off-site kg	Total Reported Releases On- and Off-site %
33	Primary Metals	10	3.87	17	21.80	19	29.50	57	9	25.63	662
491/493	Electric Utilities	17	17.88	17	10.67	17	10.60	20	0	-7.28	-41
24	Lumber and Wood Products	8	0.25	18	0.07	16	4.18	8	8	3.93	1,604
95	Air, Water & Solid Waste Management*	39	2.62	35	2.35	35	2.44	5	-4	-0.19	-7
49	Sewerage Systems*	7	9.47	7	10.13	6	1.90	4	-1	-7.57	-80
32	Stone/Clay/Glass Products	13	2.09	11	1.25	12	1.58	3	-1	-0.51	-24
28	Chemicals**	3	0.33	3	2.85	4	0.69	1	1	0.36	111
495/738	Hazardous Waste Mgt./Solvent Recovery	2	0.07	3	0.90	4	0.68	1	2	0.61	875
26	Paper Products	14	0.29	13	0.33	12	0.38	1	-2	0.09	30
39	Misc. Manufacturing Industries	1	0.03	1	0.03	1	0.17	0.3	0	0.13	397
14	Nonmetallic Minerals Mining*	0	0.00	1	0.01	1	0.01	0.02	1	0.01	--
80	Health and Allied Services*	2	0.003	3	0.004	3	0.004	0.01	1	0.002	51
25	Furniture and Fixtures	0	0.000	0	0.000	1	0.004	0.01	1	0.004	--
09	Fishing, Hunting, Trapping*	1	0.003	1	0.003	1	0.003	0.01	0	0.000	2
10	Metal Mining	0	0.000	0	0.000	1	0.000	0.001	1	0.000	--
13	Oil and Gas Extraction*	1	0.002	1	0.001	0	0.00	0	-1	-0.002	-100
34	Fabricated Metals Products	1	0.03	0	0.00	0	0.00	0	-1	-0.03	-100
36	Electronic/Electrical Equipment	1	0.05	0	0.00	0	0.00	0	-1	-0.05	-100
37	Transportation Equipment	2	0.51	0	0.00	0	0.00	0	-2	-0.51	-100
47	Transportation Services*	1	0.01	1	0.01	0	0.00	0	-1	-0.01	-100
	Total	**123**	**37.50**	**132**	**50.43**	**133**	**52.15**	**100**	**10**	**14.65**	**39**

* Industry not require to report to TRI.

** Only manufacturers of chlorinated organic solvents or chlorinated monomers are required to report hexachlorobenzene to NPRI.

Table 10–40. NPRI Facilities with Largest Total Reported Amounts of Releases On- and Off-site of Hexachlorobenzene in 2002, 2000–2002

			SIC Codes		2000		2001		2002		Change 2000–2002	
Rank	Facility	City, Province	Canada	US	Number of Forms	Total Releases On- and Off-site (kg)	Number of Forms	Total Releases On- and Off-site (kg)	Number of Forms	Total Releases On- and Off-site (kg)	Number of Forms	Total Releases On- and Off-site (kg)
1	Métallurgie Magnola Inc., Noranda Inc./Société générale de financement du Québec	Danville, QC	29	33	1	0.31	1	12.48	1	18.27	0	17.96
2	Noranda Inc, Brunswick Smelter	Belledune, NB	29	33	0	0.00	0	0.00	1	5.81	1	5.81
3	Slocan Group, Tackama Division, Slocan Forest Products	Ft. Nelson, BC	25	24	0	0.00	0	0.00	1	2.71	1	2.71
4	Sheerness Generating Station, ATCO Power/TransAlta Utilities Corporation	Hanna, AB	49	491/493	1	2.01	1	2.22	1	2.15	0	0.14
5	Epcor Generation Inc., Genesee Thermal Generating Station	Warburg, AB	41	49	1	2.11	1	2.08	1	2.14	0	0.03
	Subtotal				**3**	**4.43**	**3**	**16.78**	**5**	**31.09**	**2**	**26.65**
	% of Total				**2**	**12**	**2**	**33**	**4**	**60**		
	Total				**123**	**37.50**	**132**	**50.43**	**133**	**52.15**	**10**	**14.65**

Table 10–41. Polycyclic Aromatic Compounds (PACs/PAHs) Reported at Lower Thresholds, NPRI and TRI

CAS Number	Chemical	NPRI	TRI
56-55-3	Benzo(a)anthracene	X	X
218-01-9	Benzo(a)phenanthrene	X	X
50-32-8	Benzo(a)pyrene	X	X
205-99-2	Benzo(b)fluoranthene	X	X
205-82-3	Benzo(j)fluoranthene	X	X
207-08-9	Benzo(k)fluoranthene	X	X
224-42-0	Dibenzo(a,j)acridine	X	X
53-70-3	Dibenzo(a,h)anthracene	X	X
189-55-9	Dibenzo(a,i)pyrene	X	X
194-59-2	7H-Dibenzo(c,g)carbazole	X	X
206-44-0	Fluoranthene	X	X
193-39-5	Indeno[1,2,3-cd]pyrene	X	X
191-24-2	Benzo(g,h,i)perylene	X	X*
85-01-8	Phenanthrene	X	X**
192-97-2	Benzo(e)pyrene	X	
129-00-0	Pyrene	X	
198-55-0	Perylene	X	
226-36-8	Dibenzo(a,h)acridine		X
5385-75-1	Dibenzo(a,e)fluoranthene		X
192-65-4	Dibenzo(a,e)pyrene		X
189-64-0	Dibenzo(a,h)pyrene		X
191-30-0	Dibenzo(a,l)pyrene		X
57-97-6	7,12-Dimethylbenz(a)anthracene		X
56-49-5	3-Methylcholanthrene		X
3697-24-3	5-Methylchrysene		X
5522-43-0	1-Nitropyrene		X

Note: TRI reports on PACs as one amount for the group of chemicals. NPRI reports amounts for each chemical individually.
* Reported separately from PAC group in TRI at lower threshold of 4.5 kg.
** Reported separately from PAC group in TRI at higher threshold of 11,340 kg.

for 2002. The Epcor Genesee Thermal Generating Station in Warburg, Alberta, reported the second-largest such releases for an electric utility, with 2.14 kg.

- The five NPRI facilities with the largest releases on- and off-site of hexachlorobenzene accounted for 60 percent of total releases in 2002.

10.6 Polycyclic Aromatic Compounds

Polycyclic aromatic compounds (PACs) are a group of chemicals with similar chemical structure. PACs are also known as polycyclic aromatic hydrocarbons (PAHs). PACs are persistent, bioaccumulative toxic chemicals and have been classified as CEPA toxic. Some PACs are known or suspected carcinogens, developmental toxicants and endocrine disruptors. The main source of PACs is combustion byproducts. Human exposure can occur through breathing air contaminated by such sources as wood stoves, agricultural burning, certain industrial facilities, vehicles, and tobacco smoke.

For the 2000 reporting year, NPRI added PACs at an alternative threshold and, under its PBT program, TRI added two PACs and lowered the threshold for others. The reporting of PACs differs between NPRI and TRI, which makes the data difficult to compare. PACs are not on the list of chemicals to be reported under the current RETC program.

10.6.1 Reporting Requirements

Some PACs have been reported to TRI since 1995; others were added under the PBT program for the reporting year 2002. In TRI, one amount for a group of 21 PACs is reported, while the amount for benzo(g,h,i)perylene is reported separately. For NPRI, each of the 17 PACs on the NPRI list is reported separately. Only if the amounts for the individual PACs are not known can the amounts for the group or any combination of the 17 be reported. The list of PACs differs between NPRI and TRI, as seen in **Table 10–41**. Under the CEC Action Plan, the governments have discussed methods to make these lists more comparable.

In addition, NPRI and TRI have different reporting thresholds. In TRI, it is 100 pounds (45.5 kg) manufactured, processed or otherwise used. This applies to the sum of the quantities for the 21 PACs in the TRI PAC group. The threshold for benzo(g,h,i)perylene is 4.5 kg. For NPRI, the alternative threshold is 50 kg incidentally manufactured and released or transferred for the group of 17 PACs together. Also, all PACs released or transferred from a wood-preservation process using creosote must be reported, regardless of the amount or the number of employees.

These differences mean that NPRI and TRI data on PACs are not comparable. This section, therefore, presents the data separately.

10.6.2 Releases and Transfers of Polycyclic Aromatic Compounds from Industrial Sources, NPRI and TRI, 2000–2002

NPRI Releases and Transfers of PACs

- For the year 2002, 1,262 forms were submitted by NPRI facilities reporting on one or more polycyclic aromatic compounds.
- Total releases and transfers of PACs amounted to almost 568,000 kg. This was a decrease of 10 percent from 2000. The number of forms submitted for PACs increased by 35 percent from 2000.
- Total releases of PACs decreased by 15 percent from 2000 to 2002, including a decrease of 16 percent in on-site releases and a decrease of 6 percent in off-site releases.
- However, transfers of PACs increased. PACS in transfers of materials to recycling increased by 66 percent and other transfers increased by 154 percent.

Table 10–42. NPRI Releases and Transfers of Polycyclic Aromatic Compounds (PACs), by Chemical, 2000 and 2002 (Ordered by Total Releases, 2002)

		Forms			Total On-site Releases			Total Off-site Releases			Total Releases On- and Off-site		
CAS Number	Chemical	2000 Number	2002 Number	Change 2000–2002 (%)	2000 (kg)	2002 (kg)	Change 2000–2002 (%)	2000 (kg)	2002 (kg)	Change 2000–2002 (%)	2000 (kg)	2002 (kg)	Change 2000–2002 (%)
	NPRI PAC Chemicals Included in TRI PAC Group												
206-44-0	Fluoranthene	68	96	41	97,202	58,800	-40	16,157	9,742	-40	113,359	68,541	-40
205-99-2	Benzo(b)fluoranthene	64	88	38	45,672	33,177	-27	6,263	11,424	82	51,936	44,601	-14
56-55-3	Benzo(a)anthracene	63	88	40	29,314	22,082	-25	5,602	7,106	27	34,916	29,189	-16
50-32-8	Benzo(a)pyrene	64	87	36	22,412	19,458	-13	7,871	5,495	-30	30,282	24,953	-18
218-01-9	Benzo(a)phenanthrene	52	63	21	5,563	10,548	90	3,071	6,479	111	8,634	17,027	97
193-39-5	Indeno(1,2,3-CD)pyrene	60	82	37	10,852	11,199	3	4,496	3,410	-24	15,348	14,609	-5
207-08-9	Benzo(k)fluoranthene	63	77	22	17,444	10,693	-39	2,016	1,500	-26	19,460	12,193	-37
205-82-3	Benzo(j)fluoranthene	41	58	41	8,954	6,322	-29	7	2,259	31,500	8,961	8,581	-4
53-70-3	Dibenzo(a,h)anthracene	60	75	25	5,415	5,752	6	1,421	1,232	-13	6,836	6,984	2
189-55-9	Dibenzo(a,i)pyrene	35	46	31	3,197	2,034	-36	72	6	-91	3,269	2,040	-38
194-59-2	7H-Dibenzo(c,g)carbazole	30	39	30	70	9	-87	0	0	231	70	9	-87
224-42-0	Dibenz(a,j)acridine	32	42	31	71	9	-88	0	0	--	71	9	-88
	Subtotal	**632**	**841**	**33**	**246,166**	**180,082**	**-27**	**46,975**	**48,653**	**4**	**293,141**	**228,735**	**-22**
	NPRI PAC Chemicals not Included in TRI PAC Group but Reported Separately to TRI												
85-01-8	Phenanthrene*	72	98	36	146,359	137,425	-6	18,754	7,683	-59	165,112	145,108	-12
191-24-2	Benzo(g,h,i)perylene**	62	80	29	10,524	14,042	33	3,984	4,024	1	14,507	18,066	25
	Subtotal	**134**	**178**	**33**	**156,882**	**151,467**	**-3**	**22,737**	**11,707**	**-49**	**179,620**	**163,174**	**-9**
	NPRI PAC Chemicals not Included in TRI PAC Group and not Reported Separately to TRI												
129-00-0	Pyrene	69	92	33	81,240	78,250	-4	12,814	15,272	19	94,055	93,522	-1
192-97-2	Benzo(e)pyrene	44	72	64	31,420	24,418	-22	4,490	6,210	38	35,910	30,628	-15
	PACs, Total***	17	19	12	4,540	2,592	-43	69	306	343	4,609	2,898	-37
198-55-0	Perylene	39	60	54	1,231	932	-24	971	937	-3	2,202	1,870	-15
	Subtotal	**169**	**243**	**44**	**118,431**	**106,192**	**-10**	**18,344**	**22,725**	**24**	**136,776**	**128,917**	**-6**
	Total	**935**	**1,262**	**35**	**521,480**	**437,742**	**-16**	**88,057**	**83,084**	**-6**	**609,537**	**520,826**	**-15**

Note: Chemicals subject to the alternative threshold of 50 kg total releases and transfers for the 17 chemicals. Does not include Petroleum Bulk Terminals (US SIC Code 5171) since they reported for the first time for 2002.

* This chemical is reported under a higher threshold (11,340 kg) in TRI and is not part of the TRI PAC group.

** This chemical is reported under a lower threshold (4.5 kg) in TRI and is not part of the TRI PAC group.

*** NPRI facilities can report one total for all or any combination of the 17 PACs if the information is not available to estimate releases and transfers for the individual PACs.

Table 10–42. (*continued*)

		Total Transfers to Recycling			Total Other Transfers for Further Management			Total Reported Releases and Transfers		
CAS Number	Chemical	2000 (kg)	2002 (kg)	Change 2000–2002 (%)	2000 (kg)	2002 (kg)	Change 2000–2002 (%)	2000 (kg)	2002 (kg)	Change 2000–2002 (%)
	NPRI PAC Chemicals Included in TRI PAC Group									
206-44-0	Fluoranthene	1,619	2,989	85	1,184	3,408	188	116,162	74,939	-35
205-99-2	Benzo(b)fluoranthene	167	231	39	151	66	-56	52,253	44,899	-14
56-55-3	Benzo(a)anthracene	593	1,018	72	120	1,029	759	35,628	31,236	-12
50-32-8	Benzo(a)pyrene	27	674	2,364	74	865	1,067	30,384	26,491	-13
218-01-9	Benzo(a)phenanthrene	6	214	3,332	14	1,066	7,434	8,655	18,307	112
193-39-5	Indeno(1,2,3-CD)pyrene	4	103	2,266	37	531	1,350	15,389	15,243	-1
207-08-9	Benzo(k)fluoranthene	5	51	972	6	35	514	19,471	12,279	-37
205-82-3	Benzo(j)fluoranthene	0	2	917	2	0	-99	8,963	8,582	-4
53-70-3	Dibenzo(a,h)anthracene	2	57	2,308	9	109	1,100	6,847	7,150	4
189-55-9	Dibenzo(a,i)pyrene	0	0	9	4	0	-100	3,273	2,040	-38
194-59-2	7H-Dibenzo(c,g)carbazole	10	0	-100	0	0	--	80	9	-89
224-42-0	Dibenz(a,j)acridine	8	0	-100	0	0	--	79	9	-89
	Subtotal	**2,443**	**5,340**	**119**	**1,600**	**7,108**	**344**	**297,184**	**241,184**	**-19**
	NPRI PAC Chemicals not Included in TRI PAC Group but Reported Separately to TRI									
85-01-8	Phenanthrene*	11,759	18,204	55	1,712	7,366	330	178,584	170,678	-4
191-24-2	Benzo(g,h,i)perylene**	110	180	63	38	549	1,334	14,656	18,795	28
	Subtotal	**11,869**	**18,384**	**55**	**1,751**	**7,915**	**352**	**193,240**	**189,473**	**-2**
	NPRI PAC Chemicals not Included in TRI PAC Group and not Reported Separately to TRI									
129-00-0	Pyrene	3,045	5,024	65	2,196	2,569	17	99,296	101,115	2
192-97-2	Benzo(e)pyrene	32	120	270	6	491	8,191	35,948	31,238	-13
--	PACs, Total***	21	0	-100	1,543	5	-100	6,173	2,903	-53
198-55-0	Perylene	1	21	2,033	36	7	-81	2,239	1,898	-15
	Subtotal	**3,100**	**5,165**	**67**	**3,781**	**3,072**	**-19**	**143,656**	**137,154**	**-5**
	Total	**17,411**	**28,889**	**66**	**7,131**	**18,096**	**154**	**634,080**	**567,811**	**-10**

Note: Chemicals subject to the alternative threshold of 50 kg total releases and transfers for the 17 chemicals. Does not include Petroleum Bulk Terminals (US SIC Code 5171) since they reported for the first time for 2002.

* This chemical is reported under a higher threshold (11,340 kg) in TRI and is not part of the TRI PAC group.

** This chemical is reported under a lower threshold (4.5 kg) in TRI and is not part of the TRI PAC group.

*** NPRI facilities can report one total for all or any combination of the 17 PACs if the information is not available to estimate releases and transfers for the individual PACs.

- If we analyze the NPRI data using the same PACs reported to TRI (the 12 PACs plus benzo(g,h,i)perylene), this TRI PAC group accounted for almost 260,000 kg or 46 percent of the total releases and transfers reported to NPRI. Total releases and transfers for this TRI PAC group decreased by 17 percent from 2000, mainly because of recycling and other transfers.

TRI Releases and Transfers of PACs

For the year 2002, 3,724 forms were submitted by TRI facilities for polycyclic aromatic compounds or benzo(g,h,i)perylene or phenanthrene. Except for nine chemicals (see **Table 10–41**), these chemicals are reported to NPRI under alternative thresholds.

- The total releases and transfers in TRI for PACs were 2.6 million kg in 2002, a decrease of 19 percent from 2000. On-site releases decreased by 40 percent. Off-site releases decreased by 76 percent. Other off-site transfers for further management increased by 193 percent and transfers to recycling increased by 43 percent.
- The group of 21 PACs plus benzo(g,h,i)perylene that are reported under lower thresholds as PBTs in TRI totaled 1.9 million kg and accounted for 74 percent of the total for all PACs. This set of chemicals does not include phenanthrene, which only NPRI lists as a PAC.
- The group of 21 PACs plus benzo(g,h,i)perylene showed a decrease of 31 percent in total releases and transfers from 2000 to 2002, with total releases on- and off-site decreasing by 69 percent.

Table 10–43. TRI Releases and Transfers of Polycyclic Aromatic Compounds (PACs), by Chemical, 2000 and 2002*

		Forms			Total On-site Releases			Total Off-site Releases			Total Releases On- and Off-site		
CAS Number	Chemical	2000 Number	2002 Number	Change 2000–2002 (%)	2000 (kg)	2002 (kg)	Change 2000–2002 (%)	2000 (kg)	2002 (kg)	Change 2000–2002 (%)	2000 (kg)	2002 (kg)	Change 2000–2002 (%)
	TRI Chemicals Listed as PAC/PBT on NPRI and TRI												
--	Polycyclic aromatic compounds*	2,287	2,193	-4	771,278	353,459	-54	1,448,105	318,585	-78	2,219,384	672,044	-70
191-24-2	Benzo(g,h,i)perylene**	1,452	1,429	-2	21,560	13,234	-39	53,073	17,379	-67	74,633	30,613	-59
	Subtotal	**3,739**	**3,622**	**-3**	**792,838**	**366,693**	**-54**	**1,501,178**	**335,964**	**-78**	**2,294,016**	**702,657**	**-69**
	TRI Chemical Listed as PAC/PBT on NPRI only												
85-01-8	Phenanthrene***	104	102	-2	62,036	149,897	142	13,113	20,242	54	75,149	170,139	126
	Total	**3,843**	**3,724**	**-3**	**854,874**	**516,590**	**-40**	**1,514,292**	**356,206**	**-76**	**2,369,165**	**872,796**	**-63**

* Includes 21 individual chemicals reported as a group and subject to reporting threshold of 45.4 kg manufactured, processed or otherwise used for any individual chemical. Twelve of the 21 are listed on NPRI.

** Subject to lower reporting threshold of 4.5 kg manufactured, processed or otherwise used.

*** Subject to higher reporting threshold of 11,340 kg manufactured, processed or otherwise used.

Table 10–43. (*continued*)

CAS Number	Chemical	Total Transfers to Recycling 2000 (kg)	Total Transfers to Recycling 2002 (kg)	Total Transfers to Recycling Change 2000–2002 (%)	Total Other Transfers for Further Management 2000 (kg)	Total Other Transfers for Further Management 2002 (kg)	Total Other Transfers for Further Management Change 2000–2002 (%)	Total Reported Releases and Transfers 2000 (kg)	Total Reported Releases and Transfers 2002 (kg)	Total Reported Releases and Transfers Change 2000–2002 (%)
	TRI Chemicals Listed as PAC/PBT on NPRI and TRI									
--	Polycyclic aromatic compounds*	287,212	417,875	45	206,735	750,735	263	2,713,331	1,840,654	-32
191-24-2	Benzo(g,h,i)perylene**	4,476	20,747	363	4,108	44,120	974	83,217	95,480	15
	Subtotal	**291,689**	**438,621**	**50**	**210,843**	**794,855**	**277**	**2,796,548**	**1,936,134**	**-31**
	TRI Chemical Listed as PAC/PBT on NPRI only									
85-01-8	Phenanthrene***	242,592	327,050	35	128,393	198,116	54	446,134	695,306	56
	Total	**534,281**	**765,672**	**43**	**339,236**	**992,971**	**193**	**3,242,682**	**2,631,439**	**-19**

* Includes 21 individual chemicals reported as a group and subject to reporting threshold of 45.4 kg manufactured, processed or otherwise used for any individual chemical. Twelve of the 21 are listed on NPRI.

** Subject to lower reporting threshold of 4.5 kg manufactured, processed or otherwise used.

*** Subject to higher reporting threshold of 11,340 kg manufactured, processed or otherwise used.

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Appendix A – A Comparison of Chemicals Listed under 2002 TRI, NPRI and RETC*

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
50-00-0	Formaldehyde	Formaldéhyde	Formaldehído	X	X	X
50-29-3	DDT	DDT	DDT			X
50-32-8	Benzo(a)pyrene	Benzo(a)pyrène	Benzo(a)pireno	**	X	
51-03-6	Piperonyl butoxide	Pipéronyl butoxyde	Piperonil butóxido	X		
51-21-8	Fluorouracil	Fluoro-uracil	Fluorouracilo	X		
51-28-5	2,4-Dinitrophenol	2,4-Dinitrophénol	2,4-Dinitrofenol	X		
51-75-2	Nitrogen mustard	Moutarde azotée	Mostaza de nitrógeno	X		
51-79-6	Urethane	Uréthane	Uretano	X		
52-68-6	Trichlorfon	Trichlorfon	Triclorfón	X		
52-85-7	Famphur	Famphur	Famfur	X		
53-70-3	Dibenzo(a,h)anthracene	Dibenzo(a,h)anthracène	Dibenzo(a,h)antraceno	**	X	
53-96-3	2-Acetylaminofluorene	2-Acétylaminofluorène	2-Acetilaminofluoreno	X		
55-18-5	N-Nitrosodiethylamine	N-Nitrosodiéthylamine	N-Nitrosodietilamina	X		
55-21-0	Benzamide	Benzamide	Benzamida	X		
55-38-9	Fenthion	Fenthion	Fentión	X		
55-63-0	Nitroglycerin	Nitroglycérine	Nitroglicerina	X	X	
56-23-5	Carbon tetrachloride	Tétrachlorure de carbone	Tetracloruro de carbono	X	X	X
56-35-9	Bis(tributyltin) oxide	Oxyde de bis(tributylétain)	Óxido de tributilestaño	X		
56-38-2	Parathion	Parathion	Paratión	X		
56-55-3	Benzo(a)anthracene	Benzo(a)anthracène	Benzo(a)antraceno	**	X	
57-14-7	1,1-Dimethylhydrazine	1,1-Diméthylhydrazine	1,1-Dimetilhidracina	X		
57-33-0	Pentobarbital sodium	Pentobarbital sodique	Pentobarbital sódico	X		
57-41-0	Phenytoin	Phénytoine	Fenitoina	X		
57-57-8	beta-Propiolactone	bêta-Propiolactone	beta-Propiolactona	X		
57-74-9	Chlordane	Chlordane	Clordano	X		X
58-89-9	Lindane	Lindane	Lindano	X		X
58-90-2	2,3,4,6-Tetrachlorophenol	2,3,4,6-Tétrachlorophénol	2,3,4,6-Tetraclorofenol			X
59-89-2	N-Nitrosomorpholine	n-Nitrosomorpholine	N-Nitrosomorfolina	X		
60-09-3	4-Aminoazobenzene	4-Aminoazobenzène	4-Aminoazobenceno	X		
60-11-7	4-Dimethylaminoazobenzene	4-Diméthylaminoazobenzène	4-Dimetilaminoazobenceno	X		
60-34-4	Methylhydrazine	Méthylhydrazine	Metilhidracina	X		
60-35-5	Acetamide	Acétamide	Acetamida	X		
60-51-5	Dimethoate	Diméthoate	Dimetoato	X		
60-57-1	Dieldrin	Dieldrine	Dieldrín			X
61-82-5	Amitrole	Amitrole	Amitrol	X		
62-53-3	Aniline	Aniline	Anilina	X	X	X
62-55-5	Thioacetamide	Thioacétamide	Tioacetamida	X		
62-56-6	Thiourea	Thio-urée	Tiourea	X	X	
62-73-7	Dichlorvos	Dichlorvos	Diclorvos	X		
62-74-8	Sodium fluoroacetate	Fluoroacétate de sodium	Fluoroacetato de sodio	X		
62-75-9	N-Nitrosodimethylamine	N-Nitrosodiméthylamine	N-Nitrosodimetilamina	X		X
63-25-2	Carbaryl	Carbaryl	Carbaril	X		
64-18-6	Formic acid	Acide formique	Ácido fórmico	X	X	
64-67-5	Diethyl sulfate	Sulfate de diéthyle	Sulfato de dietilo	X	X	
64-75-5	Tetracycline hydrochloride	Chlorhydrate de tétracycline	Clorhidrato de tetraciclina	X	X	
67-56-1	Methanol	Méthanol	Metanol	X	X	
67-63-0	Isopropyl alcohol	Alcool iso-propylique	Alcohol isopropílico	X	X	
67-66-3	Chloroform	Chloroforme	Cloroformo	X	X	X
67-72-1	Hexachloroethane	Hexachloroéthane	Hexacloroetano	X	X	X
68-12-2	N,N-Dimethylformamide	N,N-Diméthyl formamide	N.N-Dimetilformamida	X	X	

* RETC list of chemicals for voluntary reporting in Section 5 of COA. Does not include Criteria Air Contaminants.
** Reported under TRI as part of polycyclic aromatic compounds group.

Appendix A – A Comparison of Chemicals Listed under 2002 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
68-76-8	Triaziquone	Triaziquone	Triaziquone	X		
70-30-4	Hexachlorophene	Hexachlorophène	Hexaclorofeno	X	X	
71-36-3	n-Butyl alcohol	Butan-1-ol	Alcohol n-butílico	X	X	
71-43-2	Benzene	Benzène	Benceno	X	X	X
71-55-6	1,1,1-Trichloroethane	1,1,1-Trichloroéthane	1,1,1-Tricloroetano	X		X
72-02-8	Endrin	Endrine	Endrín			X
72-43-5	Methoxychlor	Méthoxychlore	Metoxicloro	X		X
72-57-1	Trypan blue	Bleu trypan	Azultripán	X		
74-82-8	Methane	Méthane	Metano			X
74-83-9	Bromomethane	Bromométhane	Bromometano	X	X	X
74-85-1	Ethylene	Éthylène	Etileno	X	X	
74-87-3	Chloromethane	Chlorométhane	Clorometano	X	X	X
74-88-4	Methyl iodide	Iodométhane	Yoduro de metilo	X	X	
74-90-8	Hydrogen cyanide	Cyanure d'hydrogène	Ácido cianhídrico	X	X	
74-95-3	Methylene bromide	Bromure de méthyle	Bromuro de metilo	X		
75-00-3	Chloroethane	Chloroéthane	Cloroetano	X	X	
75-01-4	Vinyl chloride	Chlorure de vinyle	Cloruro de vinilo	X	X	X
75-05-8	Acetonitrile	Acétonitrile	Acetonitrilo	X	X	
75-07-0	Acetaldehyde	Acétaldéhyde	Acetaldehído	X	X	X
75-09-2	Dichloromethane	Dichlorométhane	Diclorometano	X	X	X
75-15-0	Carbon disulfide	Disulfure de carbone	Disulfuro de carbono	X	X	
75-21-8	Ethylene oxide	Oxyde d'éthylène	Óxido de etileno	X	X	
75-25-2	Bromoform	Bromoforme	Bromoformo	X		X
75-27-4	Dichlorobromomethane	Dichlorobromométhane	Diclorobromometano	X		
75-34-3	1,1-Dichloroethane	1,1-Dichloroéthane	1,1-Dicloroetano	X		
75-35-4	Vinylidene chloride	Chlorure de vinylidène	Cloruro de vinilideno	X	X	
75-43-4	Dichlorofluoromethane (HCFC-21)	Dichlorofluorométhane (HCFC-21)	Diclorofluorometano (HCFC-21)	X		
75-44-5	Phosgene	Phosgène	Fosgeno	X	X	
75-45-6	Chlorodifluoromethane (HCFC-22)	Chlorodifluorométhane (HCFC-22)	Clorodifluorometano (HCFC-22)	X	X	X
75-55-8	Propylenimine	Propylènimine	Propilenimina	X		
75-56-9	Propylene oxide	Oxyde de propylène	Óxido de propileno	X	X	
75-63-8	Bromotrifluoromethane (Halon 1301)	Bromotrifluorométhane (Halon 1301)	Bromotrifluorometano (Halon 1301)	X	X	X
75-65-0	tert-Butyl alcohol	2-Méthylpropan-2-ol	Alcohol terbutílico	X	X	
75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	1-Chloro-1,1-difluoroéthane (HCFC-142b)	1-Cloro-1,1-difluoroetano (HCFC-142b)	X	X	X
75-69-4	Trichlorofluoromethane (CFC-11)	Trichlorofluorométhane (CFC-11)	Triclorofluorometano (CFC-11)	X	X	X
75-71-8	Dichlorodifluoromethane (CFC-12)	Dichlorodifluorométhane (CFC-12)	Diclorodifluorometano (CFC-12)	X	X	X
75-72-9	Chlorotrifluoromethane (CFC-13)	Chlorotrifluorométhane (CFC-13)	Clorotrifluorometano (CFC-13)	X	X	X
75-86-5	2-Methyllactonitrile	Acétonecyanhydrine	2-Metillactonitrilo	X		
75-88-7	2-Chloro-1,1,1-trifluoroethane (HCFC-133a)	Chloro-1,1,1-trifluoroéthane (HCFC-133a)	2-Cloro-1,1,1-trifluoroetano (HCFC-133a)	X		
76-01-7	Pentachloroethane	Pentachloroéthane	Pentacloroetano	X	X	
76-02-8	Trichloroacetyl chloride	Chlorure de trichloroacétyle	Cloruro de tricloroacetilo	X		
76-06-2	Chloropicrin	Chloropicrine	Cloropicrina	X		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	1,1,2-Trichloro-1,2,2-trifluoroéthane (CFC-113)	1,1,2-Tricloro-1,2,2-trifluoroetano (CFC-113)	X		X
76-14-2	Dichlorotetrafluoroethane (CFC-114)	Dichlorotétrafluoroéthane (CFC-114)	Diclorotetrafluoroetano (CFC-114)	X	X	X
76-15-3	Monochloropentafluoroethane (CFC-115)	Chloropentafluoroéthane (CFC-115)	Cloropentafluoroetano (CFC-115)	X	X	X
76-44-8	Heptachlor	Heptachlore	Heptacloro	X		X
76-87-9	Triphenyltin hydroxide	Hydroxyde de triphénylétain	Hidróxido de trifenilestaño	X		
77-47-4	Hexachlorocyclopentadiene	Hexachlorocyclopentadiène	Hexaclorciclopentadieno	X	X	X
77-73-6	Dicyclopentadiene	Dicyclopentadiène	Dicloropentadieno	X	X	
77-78-1	Dimethyl sulfate	Sulfate de diméthyle	Sulfato de dimetilo	X	X	

* RETC list of chemicals for voluntary reporting in Section 5 of COA. Does not include Criteria Air Contaminants.

Appendix A – A Comparison of Chemicals Listed under 2002 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
78-00-2	Tetraethyl lead	Plomb tétraéthyle	Tetraetilo de plomo	X	X	X
78-48-8	S,S,S-Tributyltrithiophosphate	Trithiophosphate de S,S,S-tributyle	S,S,S-Tributiltritiofosfato	X		
78-79-5	Isoprene	Isoprène	Isopreno		X	
78-83-1	i-Butyl alcohol	2-Méthylpropan-1-ol	Alcohol i-butílico		X	
78-84-2	Isobutyraldehyde	Isobutyraldéhyde	Isobutiraldehído	X	X	
78-87-5	1,2-Dichloropropane	1,2-Dichloropropane	1,2-Dicloropropano	X	X	
78-88-6	2,3-Dichloropropene	2,3-Dichloropropène	2,3-Dicloropropeno	X		
78-92-2	sec-Butyl alcohol	Butan-2-ol	Alcohol sec-butílico	X	X	
78-93-3	Methyl ethyl ketone	Méthyléthylcétone	Metil etil cetona	X	X	
79-00-5	1,1,2-Trichloroethane	1,1,2-Trichloroéthane	1,1,2-Tricloroetano	X	X	X
79-01-6	Trichloroethylene	Trichloroéthylène	Tricloroetileno	X	X	X
79-06-1	Acrylamide	Acrylamide	Acrilamida	X	X	X
79-10-7	Acrylic acid	Acide acrylique	Ácido acrílico	X	X	
79-11-8	Chloroacetic acid	Acide chloroacétique	Ácido cloroacético	X	X	
79-19-6	Thiosemicarbazide	Thiosemicarbazide	Tiosemicarbacida	X		
79-21-0	Peracetic acid	Acide peracétique	Ácido peracético	X	X	
79-22-1	Methyl chlorocarbonate	Chlorocarbonate de méthyle	Clorocarbonato de metilo	X		
79-34-5	1,1,2,2-Tetrachloroethane	1,1,2,2-Tétrachloroéthane	1,1,2,2-Tetracloroetano	X	X	X
79-44-7	Dimethylcarbamyl chloride	Chlorure de diméthylcarbamyle	Cloruro de dimetilcarbamil	X		
79-46-9	2-Nitropropane	2-Nitropropane	2-Nitropropano	X	X	X
79-94-7	Tetrabromobisphenol A	Tétrabromobisphénol A	Tetrabromobisfenol A	X		
80-05-7	4,4'-Isopropylidenediphenol	p,p'-Isopropylidènediphénol	4,4'-Isopropilidenodifenol	X	X	
80-15-9	Cumene hydroperoxide	Hydroperoxyde de cumène	Cumeno hidroperóxido	X	X	
80-62-6	Methyl methacrylate	Méthacrylate de méthyle	Metacrilato de metilo	X	X	
81-07-2	Saccharin	Saccharine	Sacarina	X		
81-88-9	C.I. Food Red 15	Indice de couleur Rouge alimentaire 15	Rojo 15 alimenticio	X	X	
82-28-0	1-Amino-2-methylanthraquinone	1-Amino-2-méthylanthraquinone	1-Amino-2-metilantraquinona	X		
82-68-8	Quintozene	Quintozène	Quintoceno	X		
84-66-2	Diethyl phthalate	Phtalate de diéthyle	Dietil ftalato		X	
84-74-2	Dibutyl phthalate	Phtalate de dibutyle	Dibutil ftalato	X	X	X
85-01-8	Phenanthrene	Phénanthrène	Fenantreno	X	X	
85-44-9	Phthalic anhydride	Anhydride phtalique	Anhídrido ftálico	X	X	
85-68-7	Butyl benzyl phthalate	Phtalate de benzyle et de butyle	Butil bencil ftalato		X	
86-30-6	N-Nitrosodiphenylamine	N-Nitrosodiphénylamine	N-Nitrosodifenilamina	X	X	
87-62-7	2,6-Xylidine	2,6-Xylidine	2,6-Xilidina	X		
87-68-3	1,1,2,3,4,4-Hexachloro-1,3-butadiene	1,1,2,3,4,4-Hexachloro-1,3-butadiène	1,1,2,3,4,4-Hexacloro-1,3-butadieno	X		X
87-86-5	Pentachlorophenol	Pentachlorophénol	Pentaclorofenol	X		X
88-06-2	2,4,6-Trichlorophenol	2,4,6-Trichlorophénol	2,4,6-Triclorofenol	X		X
88-75-5	2-Nitrophenol	2-Nitrophénol	2-Nitrofenol	X		
88-85-7	Dinitrobutyl phenol	Dinosébé	Dinitrobutilfenol	X		
88-89-1	Picric acid	Acide picrique	Ácido pícrico	X		
90-04-0	o-Anisidine	o-Anisidine	o-Anisidina	X		
90-43-7	2-Phenylphenol	o-Phénylphénol	2-Fenilfenol	X	X	
90-94-8	Michler's ketone	Cétone de Michler	Cetona Michler	X	X	
91-08-7	Toluene-2,6-diisocyanate	Toluène-2,6-diisocyanate	Toluen-2,6-diisocianato	X	X	
91-20-3	Naphthalene	Naphtalène	Naftaleno	X	X	
91-22-5	Quinoline	Quinoléine	Quinoleína	X	X	
91-59-8	beta-Naphthylamine	bêta-Naphtylamine	beta-Naftilamina	X		X
91-94-1	3,3'-Dichlorobenzidine	3,3'-Dichlorobenzidine	3,3'-Diclorobencidina	X		
92-52-4	Biphenyl	Biphényle	Bifenilo	X	X	X

* RETC list of chemicals for voluntary reporting in Section 5 of COA. Does not include Criteria Air Contaminants.

Appendix A – A Comparison of Chemicals Listed under 2002 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
92-67-1	4-Aminobiphenyl	4-Aminobiphényle	4-Aminobifenilo	X		X
92-87-5	Benzidine	Benzidine	Bencidina	X		X
92-93-3	4-Nitrobiphenyl	4-Nitrobiphényle	4-Nitrobifenilo	X		X
93-65-2	Mecoprop	Mécoprop	Mecoprop	X		
94-11-1	2,4-D Isopropyl ester	2,4-Dichlorophénoxyacétate d'isopropyle	2,4-D isopropilester	X		
94-36-0	Benzoyl peroxide	Peroxyde de benzoyle	Peróxido de benzoilo	X	X	
94-58-6	Dihydrosafrole	Dihydrosafrole	Dihidrosafrol	X		
94-59-7	Safrole	Safrole	Safrol	X	X	
94-74-6	Methoxone	Méthoxone	Metoxona	X		
94-75-7	2,4-D (Acetic acid)	Acide dichloro-2,4-phénoxyacétique	Ácido 2,4-diclorofenoxiacético	X		X
94-80-4	2,4-D Butyl ester	2,4-Dichlorophénoxyacétate de butyle	2,4-D butilester	X		
94-82-6	2,4-DB	Acide 4-(2,4-dichlorophénoxy)butyrique	2,4-DB	X		
95-47-6	o-Xylene	o-Xylène	o-Xileno	X	X	
95-48-7	o-Cresol	o-Crésol	o-Cresol	X	X	
95-50-1	1,2-Dichlorobenzene	o-Dichlorobenzène	1,2-Diclorobenceno	X	X	X
95-53-4	o-Toluidine	o-Toluidine	o-Toluidina	X		
95-54-5	1,2-Phenylenediamine	o-Phénylènediamine	1,2-Fenilendiamina	X		
95-63-6	1,2,4-Trimethylbenzene	1,2,4-Triméthylbenzène	1,2,4-Trimetilbenceno	X	X	
95-69-2	p-Chloro-o-toluidine	4-Chloro-o-toluidine	p-Cloro-o-toluidina	X		
95-80-7	2,4-Diaminotoluene	2,4-Diaminotoluène	2,4-Diaminotolueno	X	X	
95-95-4	2,4,5-Trichlorophenol	Trichloro-2,4,5-phénol	2,4,5-Triclorofenol	X		X
96-09-3	Styrene oxide	Oxyde de styrène	Óxido de estireno	X	X	
96-12-8	1,2-Dibromo-3-chloropropane	1,2-Dibromo-3-chloropropane	1,2-Dibromo-3-cloropropano	X		
96-18-4	1,2,3-Trichloropropane	1,2,3-Trichloropropane	1,2,3-Tricloropropano	X		
96-33-3	Methyl acrylate	Acrylate de méthyle	Acrilato de metilo	X	X	
96-45-7	Ethylene thiourea	Imidazolidine-2-thione	Etilén tiourea	X	X	
97-23-4	Dichlorophene	Dichlorophène	Diclorofeno	X		
97-56-3	C.I. Solvent Yellow 3	Indice de couleur Jaune de solvant 3	Solvente de amarillo 3	X		
98-07-7	Benzoic trichloride	Trichlorure de benzylidyne	Benzotricloruro	X		
98-82-8	Cumene	Cumène	Cumeno	X	X	
98-86-2	Acetophenone	Acétophénone	Acetofenona	X	X	
98-87-3	Benzal chloride	Chlorure de benzale	Cloruro de benzal	X		
98-88-4	Benzoyl chloride	Chlorure de benzoyle	Cloruro de benzoilo	X	X	
98-95-3	Nitrobenzene	Nitrobenzène	Nitrobenceno	X	X	
99-30-9	Dichloran	Chlorure de dichlorobenzalkonium	Cloruro de diclorobenzalconio	X		
99-55-8	5-Nitro-o-toluidine	5-Nitro-o-toluidine	5-Nitro-o-toluidina	X		
99-59-2	5-Nitro-o-anisidine	5-Nitro-o-anisidine	5-Nitro-o-anisidina	X		
99-65-0	m-Dinitrobenzene	m-Dinitrobenzène	m-Dinitrobenceno	X		
100-01-6	p-Nitroaniline	p-Nitroaniline	p-Nitroanilina	X	X	
100-02-7	4-Nitrophenol	p-Nitrophénol	4-Nitrofenol	X	X	
100-25-4	p-Dinitrobenzene	p-Dinitrobenzène	p-Dinitrobenceno	X		
100-41-4	Ethylbenzene	Éthylbenzène	Etilbenceno	X	X	
100-42-5	Styrene	Styrène	Estireno	X	X	X
100-44-7	Benzyl chloride	Chlorure de benzyle	Cloruro de bencilo	X	X	
100-75-4	N-Nitrosopiperidine	N-Nitrosopipéridine	N-Nitrosopiperidina	X		
101-05-3	Anilazine	Anilazine	Anilacina	X		
101-14-4	4,4'-Methylenebis(2-chloroaniline)	p,p'-Méthylènebis(2-chloroaniline)	4,4'-Metilenobis(2-cloroanilina)	X	X	
101-61-1	4,4'-Methylenebis(N,N-dimethyl)benzeneamine	4,4'-Méthylènebis(N,N-diméthyl)benzèneamine	4,4'-Metilenobis(N,N-dimetil)bencenamina	X		
101-68-8	Methylenebis(phenylisocyanate)	Méthylènebis(phénylisocyanate)	Metilenobis(fenilisocianato)	**	X	
101-77-9	4,4'-Methylenedianiline	p,p'-Méthylènedianiline	4,4'-Metilenodianilina	X	X	

* RETC list of chemicals for voluntary reporting in Section 5 of COA. Does not include Criteria Air Contaminants.
** Reported under TRI as part of polycyclic aromatic compounds group.

Appendix A – A Comparison of Chemicals Listed under 2002 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
101-80-4	4,4'-Diaminodiphenyl ether	Éther 4,4'-diaminodiphényle	Éter 4,4'-diaminodifenílico	X		
101-90-6	Diglycidyl resorcinol ether	Éther de résorcinol et de diglycydile	Diglicidil resorcinol éter	X		
103-23-1	Bis(2-ethylhexyl) adipate	Adipate de bis(2-éthylhexyle)	Bis(2-etilhexil) adipato		X	
104-12-1	p-Chlorophenyl isocyanate	Isocyanate de 4-chlorophényle	p-Clorofenil isocianato	X		
104-35-8	2-(p-Nonylphenoxy) ethanol	2-(p-Nonylphénoxyl) éthanol	Etanol 2-p(nonilfenoxi)		X	
104-40-5	Nonylphenol	Nonylphénol	Nonilfenol		X	
104-94-9	p-Anisidine	p-Anisidine	p-Anisidina	X		
105-67-9	2,4-Dimethylphenol	2,4-Diméthylphénol	2,4-Dimetilfenol	X		
106-42-3	p-Xylene	p-Xylène	p-Xileno	X	X	
106-44-5	p-Cresol	p-Crésol	p-Cresol	X	X	
106-46-7	1,4-Dichlorobenzene	p-Dichlorobenzène	1,4-Diclorobenceno	X	X	X
106-47-8	p-Chloroaniline	p-Chloroaniline	p-Cloroanilina	X		
106-50-3	p-Phenylenediamine	p-Phénylènediamine	p-Fenilenodiamina	X	X	
106-51-4	Quinone	p-Quinone	Quinona	X	X	
106-88-7	1,2-Butylene oxide	1,2-Époxybutane	Óxido de 1,2-butileno	X	X	
106-89-8	Epichlorohydrin	Épichlorohydrine	Epiclorohidrina	X	X	X
106-93-4	1,2-Dibromoethane	1,2-Dibromoéthane	1,2-Dibromoetano	X		
106-99-0	1,3-Butadiene	Buta-1,3-diène	1,3-Butadieno	X	X	X
107-02-8	Acrolein	Acroléine	Acroleína	X	X	X
107-04-0	1-Bromo-2-chloroethane	1-Bromo-2-chloroéthane	1-Bromo-1-cloroetano		X	
107-05-1	Allyl chloride	Chlorure d'allyle	Cloruro de alilo	X	X	
107-06-2	1,2-Dichloroethane	1,2-Dichloroéthane	1,2-Dicloroetano	X	X	X
107-11-9	Allylamine	Allylamine	Alil amina	X		
107-13-1	Acrylonitrile	Acrylonitrile	Acrilonitrilo	X	X	X
107-18-6	Allyl alcohol	Alcool allylique	Alcohol alílico	X	X	
107-19-7	Propargyl alcohol	Alcool propargylique	Alcohol propargílico	X	X	
107-21-1	Ethylene glycol	Éthylèneglycol	Etilén glicol	X	X	
107-30-2	Chloromethyl methyl ether	Éther de méthyle et de chlorométhyle	Éter clorometil metílico	X		
108-05-4	Vinyl acetate	Acétate de vinyle	Acetato de vinilo	X	X	
108-10-1	Methyl isobutyl ketone	Méthylisobutylcétone	Metil isobutil cetona	X	X	
108-31-6	Maleic anhydride	Anhydride maléique	Anhídrido maleico	X	X	
108-38-3	m-Xylene	m-Xylène	m-Xileno	X	X	
108-39-4	m-Cresol	m-Crésol	m-Cresol	X	X	
108-45-2	1,3-Phenylenediamine	m-Phénylènediamine	1,3-Fenilendiamina	X		
108-60-1	Bis(2-chloro-1-methylethyl) ether	Éther di(2-chloro-1-méthyléthyle)	Éter bis(2-cloro-1-metil etil)	X		
108-88-3	Toluene	Toluène	Tolueno	X	X	
108-90-7	Chlorobenzene	Chlorobenzène	Clorobenceno	X	X	X
108-93-0	Cyclohexanol	Cyclohexanol	Ciclohexanol	X	X	
108-95-2	Phenol	Phénol	Fenol	X	X	X
109-06-8	2-Methylpyridine	2-Méthylpyridine	2-Metilpiridina	X	X	
109-77-3	Malononitrile	Malononitrile	Malononitrilo	X		
109-86-4	2-Methoxyethanol	2-Méthoxyéthanol	2-Metoxietanol	X	X	
110-49-6	2-Methoxyethyl acetate	Acétate de 2-méthoxyéthyle	2-Metoxietil acetato		X	
110-54-3	n-Hexane	n-Hexane	n-Hexano	X	X	
110-57-6	trans-1,4-Dichloro-2-butene	1,4-Dichloro-2- butène	Trans-1,4-Dicloro-2-buteno	X		
110-80-5	2-Ethoxyethanol	2-Éthoxyéthanol	2-Etoxietanol	X	X	X
110-82-7	Cyclohexane	Cyclohexane	Ciclohexano	X	X	
110-86-1	Pyridine	Pyridine	Piridina	X	X	X
111-15-9	2-Ethoxyethyl acetate	Acétate de 2-éthoxyéthyle	2-Etoxietil acetato		X	
111-42-2	Diethanolamine	Diéthanolamine	Dietanolamina	X	X	

* RETC list of chemicals for voluntary reporting in Section 5 of COA. Does not include Criteria Air Contaminants.

Appendix A – A Comparison of Chemicals Listed under 2002 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
111-44-4	Bis(2-chloroethyl) ether	Éther di(2-chloroéthyle)	Éter bis(2-cloroetil)	X		
111-76-2	2-Butoxyethanol	2-Butoxyéthanol	2-Butoxiethanol		X	
111-91-1	Bis(2-chloroethoxy) methane	Méthane di(2-chloroéthoxy)	Bis(2-cloroetoxi) metano	X		
114-26-1	Propoxur	Propoxur	Propoxur	X		
115-07-1	Propylene	Propylène	Propileno	X	X	
115-28-6	Chlorendic acid	Acide chlorendique	Ácido cloréndico	X	X	
115-29-7	Endosulfan	Endosulfan	Endosulfán			X
115-32-2	Dicofol	Dicofol	Dicofol	X		
116-06-3	Aldicarb	Aldicarbe	Aldicarb	X		
117-79-3	2-Aminoanthraquinone	2-Aminoanthraquinone	2-Aminoantraquinona	X		
117-81-7	Di(2-ethylhexyl) phthalate	Phtalate de bis(2-éthylhexyle)	Di(2-etilhexil) ftalato	X	X	
117-84-0	Di-n-octyl phthalate	Phtalate de di-n-octyle	Di-n-octil ftalato		X	
118-74-1	Hexachlorobenzene	Hexachlorobenzène	Hexaclorobenceno	X	X	X
119-90-4	3,3'-Dimethoxybenzidine	3,3'-Diméthoxybenzidine	3,3'-Dimetoxibencidina	X		
119-93-7	3,3'-Dimethylbenzidine	3,3'-Diméthylbenzidine	3,3'-Dimetilbencidina	X		
120-12-7	Anthracene	Anthracène	Antraceno	X	X	
120-36-5	2,4-DP	Dichlorprop	2,4-DP	X		
120-58-1	Isosafrole	Isosafrole	Isosafrol	X	X	
120-71-8	p-Cresidine	p-Crésidine	p-Cresidina	X		
120-80-9	Catechol	Catéchol	Catecol	X	X	
120-82-1	1,2,4-Trichlorobenzene	1,2,4-Trichlorobenzène	1,2,4-Triclorobenceno	X	X	X
120-83-2	2,4-Dichlorophenol	2,4-Dichlorophénol	2,4-Diclorofenol	X	X	
121-14-2	2,4-Dinitrotoluene	2,4-Dinitrotoluène	2,4-Dinitrotolueno	X	X	X
121-44-8	Triethylamine	Triéthylamine	Trietilamina	X	X	
121-69-7	N,N-Dimethylaniline	N,N-Diméthylaniline	N,N-Dimetilanilina	X	X	
121-75-5	Malathion	Malathion	Malatión	X		
122-34-9	Simazine	Simazine	Simacina	X		
122-39-4	Diphenylamine	Dianiline	Difenilamina	X	X	
122-66-7	1,2-Diphenylhydrazine	1,2-Diphénylhydrazine	1,2-Difenilhidracina	X		
123-31-9	Hydroquinone	Hydroquinone	Hidroquinona	X	X	
123-38-6	Propionaldehyde	Propionaldéhyde	Propionaldehído	X	X	
123-63-7	Paraldehyde	Paraldéhyde	Paraldehído	X	X	
123-72-8	Butyraldehyde	Butyraldéhyde	Butiraldehído	X	X	
123-91-1	1,4-Dioxane	1,4-Dioxane	1,4-Dioxano	X	X	X
124-38-9	Carbon dioxide	Dioxyde de carbone	Bióxido de carbono			X
124-40-3	Dimethylamine	Diméthylamine	Dimetilamina	X	X	
124-73-2	Dibromotetrafluoroethane (Halon 2402)	Dibromotétrafluoroéthane (Halon 2402)	Dibromotetrafluoroetano (Halon 2402)	X		
126-72-7	Tris(2,3-dibromopropyl) phosphate	Phosphate de tris(2,3-dibromopropyle)	Tris(2,3-dibromopropil) fosfato	X		
126-98-7	Methacrylonitrile	Méthacrylonitrile	Metacrilonitrilo	X		
126-99-8	Chloroprene	Chloroprène	Cloropreno	X		
127-18-4	Tetrachloroethylene	Tétrachloroéthylène	Tetracloroetileno	X	X	
128-03-0	Potassium dimethyldithiocarbamate	Diméthyldithiocarbamate de potassium	Dimetilditiocarbamato de potasio	X		
128-04-1	Sodium dimethyldithiocarbamate	Diméthyldithiocarbamate de sodium	Dimetilditiocarbamato de sodio	X		
128-37-0	2,6-Di-t-butyl-4-methylphenol	2,6-Di-t-butyl-4-méthylphénol	2,6-Di-t-butil-4-metilfenol		X	
128-66-5	C.I. Vat Yellow 4	Indice de couleur Jaune 4	Amarillo 4	X		
129-00-0	Pyrene	Pyréne	Pireno		X	
131-11-3	Dimethyl phthalate	Phtalate de diméthyle	Dimetil ftalato	X	X	
131-52-2	Sodium pentachlorophenate	Pentachlorophénate de sodium	Pentaclorofenato de sodio	X		
132-27-4	Sodium o-phenylphenoxide	2-Biphénylate de sodium	Ortofenilfenóxido de sodio	X		
132-64-9	Dibenzofuran	Dibenzofurane	Dibenzofurano	X		

* RETC list of chemicals for voluntary reporting in Section 5 of COA. Does not include Criteria Air Contaminants.

Appendix A – A Comparison of Chemicals Listed under 2002 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
133-06-2	Captan	Captan	Captan	X		
133-07-3	Folpet	Folpet	Folpet	X		
133-90-4	Chloramben	Chlorambène	Cloramben	X		
134-29-2	o-Anisidine hydrochloride	Chlorhydrate d'o-anisidine	o-Anisidina hidrocloruro	X		
134-32-7	alpha-Naphthylamine	alpha-Naphtylamine	alfa-Naftilamina	X		
135-20-6	Cupferron	Cupferron	Cupferron	X		
136-45-8	Dipropyl isocinchomeronate	Pyridine-2,5-dicarboxylate de dipropyle	Dipropilisocincomeronato	X		
137-26-8	Thiram	Thirame	Tiram	X		
137-41-7	Potassium N-methyldithiocarbamate	Méthyldithiocarbamate de potassium	N-Metilditiocarbamato de potasio	X		
137-42-8	Metham sodium	Métam-sodium	N-Metilditiocarbamato de sodio	X		
138-93-2	Disodium cyanodithioimidocarbonate	Cyanodithiocarbamate de disodium	Cianoditiocarbamato de disodio	X		
139-13-9	Nitrilotriacetic acid	Acide nitrilotriacétique	Ácido nitrilotriacético	X	X	
139-65-1	4,4'-Thiodianiline	4,4'-Thiodianiline	4,4'-Tiodianilina	X		
140-88-5	Ethyl acrylate	Acrylate d'éthyle	Acrilato de etilo	X	X	
140-66-9	4-tert-Octylphenol	4-tert-Octylphénol	4-ter-Octifenol		X	
141-32-2	Butyl acrylate	Acrylate de butyle	Acrilato de butilo	X	X	
142-59-6	Nabam	Nabame	Nabam	X		
148-79-8	Thiabendazole	Thiabendazole	Tiabendazol	X		
149-30-4	2-Mercaptobenzothiazole	Benzothiazole-2-thiol	2-Mercaptobenzotiazol	X	X	
150-50-5	Merphos	Trithiophosphate de tributyle	Merfos	X		
150-68-5	Monuron	Monuron	3-(4-cloro fenil)–1,1-dimetilurea	X		
151-56-4	Ethyleneimine	Éthylène imine	Etilenimina	X		
156-10-5	p-Nitrosodiphenylamine	p-Nitrosodiphénylamine	p-Nitrosodifeniamina	X		
156-62-7	Calcium cyanamide	Cyanamide calcique	Cianamida de calcio	X	X	
189-55-9	Dibenzo(a,i)pyrene	Dibenzo(a,i)pyréne	Dibenzo(a,i)pireno	**	X	
191-24-2	Benzo(g,h,i)perylene	Benzo(g,h,i)pérylène	Benzo(g,h,i)perinelo	**	X	
192-97-2	Benzo(e)pyrene	Benzo(e)pyrène	Benzo(e)pireno		X	
193-39-5	Indeno(1,2,3-c,d)pyrene	Indeno(1,2,3-c,d)pyrène	Indeno(1,2,3-c,d)pireno	**	X	
194-59-2	7H-Dibenzo(c,g)carbazole	7H-Dibenzo(c,g)carbazole	7H-Dibenzo(c,g)carbazole	**	X	
198-55-0	Perylene	Pérylène	Perinelo		X	
205-82-3	Benzo(j)fluoranthene	Benzo(j)fluoranthène	Benzo(j)fluoranteno	**	X	
205-99-2	Benzo(b)fluoranthene	Benzo(b)fluoranthène	Benzo(b)fluoranteno	**	X	
206-44-0	Fluoranthene	Fluoranthène	Fluoranteno	**	X	
207-08-9	Benzo(k)fluoranthene	Benzo(k)fluoranthène	Benzo(k)fluoranteno	**	X	
218-01-9	Benzo(a)phenanthrene	Benzo(a)phenanthrène	Benzo(a)fenanteno	**	X	
224-42-0	Dibenz(a,j)acridine	Dibenz(a,j)acridine	Dibenz(a,j)acridine	**	X	
298-00-0	Methyl parathion	Parathion-méthyl	Metilparatión	X		X
300-76-5	Naled	Naled	Naled	X		
301-12-2	Oxydemeton methyl	Oxydéméton-méthyl	Metiloximetón	X		
302-01-2	Hydrazine	Hydrazine	Hidracina	X	X	X
306-83-2	2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)	2,2-Dichlo-1,1,1-trifluoroéthane (HCFC-123)	2,2-Dicloro-1,1,1-trifluoroetano (HCFC-123)	X		X
309-00-2	Aldrin	Aldrine	Aldrín	X		X
314-40-9	Bromacil	Bromacil	Bromacilo	X		
319-84-6	alpha-Hexachlorocyclohexane	alpha-Hexachlorocyclohexane	alfa-Hexaclorociclohexano	X		
330-54-1	Diuron	Diuron	3-(3,4 dicloro-fenil)-1,1-dimetil urea	X		
330-55-2	Linuron	Linuron	3-(3,4 dicloro-fenil)-1-metoxi-1-metil urea	X		
333-41-5	Diazinon	Diazinon	Diazinon	X		
334-88-3	Diazomethane	Diazométhane	Diazometano	X		
353-59-3	Bromochlorodifluoromethane (Halon 1211)	Bromochlorodifluorométhane (Halon 1211)	Bromoclorodifluorometano (Halon 1211)	X	X	X
354-11-0	1,1,1,2-Tetrachloro-2-fluoroethane	1,1,1,2-Tétrachloro-2-fluoroéthane	1,1,1,2-Tetracloro-2- fluoroetano	X		

* RETC list of chemicals for voluntary reporting in Section 5 of COA. Does not include Criteria Air Contaminants.
** Reported under TRI as part of polycyclic aromatic compounds group.

Appendix A – A Comparison of Chemicals Listed under 2002 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
354-14-3	1,1,2,2-Tetrachloro-1-fluoroethane	1,1,2,2-Tétrachloro-1-fluoroéthane	1,1,2,2-Tetracloro-1-fluoroetano	X		
354-23-4	1,2-Dichloro-1,1,2-trifluoroethane (HCFC-123a)	1,2-Dichloro-1,1,2-trifluoroéthane (HCFC-123a)	1,2-Dicloro-1,1,2-trifluoroetano (HCFC-123a)	X		
354-25-6	1-Chloro-1,1,2,2-tetrafluoroethane (HCFC-124a)	1-Chloro-1,1,2,2-tétrafluoroéthane (HCFC-124a)	1-Cloro-1,1,2,2-tetrafluoroetano (HCFC-124a)	X		
357-57-3	Brucine	Brucine	Brucina	X		
422-44-6	1,2-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC-225bb)	1,2-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC-225bb)	1,2-Dicloro-1,1,2,3,3-pentafluoropropano (HCFC-225bb)	X		
422-48-0	2,3-Dichloro-1,1,1,2,3-pentafluoropropane (HCFC-225ba)	2,3-Dichloro-1,1,1,2,3-pentafluoropropane (HCFC-225ba)	2,3-Dicloro-1,1,1,2,3-pentafluoropropano (HCFC-225ba)	X		
422-56-0	3,3-Dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca)	3,3-Dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca)	3,3-Dicloro-1,1,1,2,2-pentafluoropropano (HCFC-225ca)	X		X
431-86-7	1,2-Dichloro-1,1,3,3,3-pentafluoropropane (HCFC-225da)	1,2-Dichloro-1,1,3,3,3-pentafluoropropane (HCFC-225da)	1,2-Dicloro-1,1,3,3,3-pentafluoropropano (HCFC-225da)	X		
460-35-5	3-Chloro-1,1,1-trifluoropropane (HCFC-253fb)	3-Chloro-1,1,1-trifluoropropane (HCFC-253fb)	3-Cloro-1,1,1-trifluoropropano (HCFC-253fb)	X		
463-58-1	Carbonyl sulfide	Sulfure de carbonyle	Sulfuro de carbonilo	X		
465-73-6	Isodrin	Isodrine	Isodrín	X		
492-80-8	C.I. Solvent Yellow 34	Indice de couleur Jaune de solvant 34	Solvente amarillo 34	X		
505-60-2	Mustard gas	Gaz moutarde	Gas mostaza	X		
507-55-1	1,3-Dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb)	1,3-Dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb)	1,3-Dicloro-1,1,2,2,3-pentafluoropropano (HCFC-225cb)	X		X
510-15-6	Chlorobenzilate	Chlorobenzilate	Clorobencilato	X		
528-29-0	o-Dinitrobenzene	o-Dinitrobenzène	o-Dinitrobenceno	X		
532-27-4	2-Chloroacetophenone	2-Chloroacétophénone	2-Cloroacetofenona	X		
533-74-4	Dazomet	Dazomet	Dazomet	X		
534-52-1	4,6-Dinitro-o-cresol	4,6-Dinitro-o-crésol	4,6-Dinitro-o-cresol	X	X	X
540-59-0	1,2-Dichloroethylene	1,2-Dichloroéthylène	1,2-Dicloroetileno	X		
541-41-3	Ethyl chloroformate	Chloroformiate d'éthyle	Cloroformiato de etilo	X	X	
541-53-7	2,4-Dithiobiuret	2,4-Dithiobiuret	2,4-Ditiobiuret	X		
541-73-1	1,3-Dichlorobenzene	1,3-Dichlorobenzène	1,3-Diclorobenceno	X		
542-75-6	1,3-Dichloropropylene	1,3-Dichloropropylène	1,3-Dicloropropileno	X		
542-76-7	3-Chloropropionitrile	3-Chloropropionitrile	3-Cloropropionitrilo	X	X	
542-88-1	Bis(chloromethyl) ether	Éther di(chlorométhylique)	Bis(clorometil) éter	X		X
554-13-2	Lithium carbonate	Carbonate de lithium	Carbonato de litio	X	X	
556-61-6	Methyl isothiocyanate	Isothiocyanate de méthyle	Isocianato de metilo	X		
563-47-3	3-Chloro-2-methyl-1-propene	3-Chloro-2-méthylpropène	3-Cloro-2-metil-1-propeno	X	X	
569-64-2	C.I. Basic Green 4	Indice de couleur Vert de base 4	Verde 4 básico	X	X	
584-84-9	Toluene-2,4-diisocyanate	Toluène-2,4-diisocyanate	Toluen-2,4-diisocianato	X	X	
593-60-2	Vinyl bromide	Bromure de vinyle	Bromuro de vinilo	X		
594-42-3	Perchloromethyl mercaptan	Perchlorométhylmercaptan	Perclorometilmercaptano	X		
606-20-2	2,6-Dinitrotoluene	2,6-Dinitrotoluène	2,6-Dinitrotolueno	X	X	
608-93-5	Pentachlorobenzene	Pentachlorobenzène	Pentaclorobenceno	X		
612-82-8	3,3'-Dimethylbenzidine dihydrochloride	Dichlorhydrate de 4,4'-bi-o-toluidine	Dihidrocloruro de 3,3'-dimetilbencidina	X		
612-83-9	3,3'-Dichlorobenzidine dihydrochloride	Dichlorhydrate de 3,3'-dichlorobenzidine	Dihidrocloruro de 3,3'-diclorobencidina	X	X	
615-05-4	2,4-Diaminoanisole	2,4-Diaminoanisole	2,4-Diaminoanisol	X		
615-28-1	1,2-Phenylenediamine dihydrochloride	Dichlorhydrate d'o-phénylènediamine	Dihidrocloruro de 1,2-fenilendiamina	X		
621-64-7	N-Nitrosodi-n-propylamine	N-Nitrosodi-n-propylamine	N-Nitrosodi-n-propilamina	X		
624-18-0	1,4-Phenylenediamine dihydrochloride	Dichlorhydrate de benzène-1,4-diamine	Dihidrocloruro de 1,4-fenilendiamina	X		
624-83-9	Methyl isocyanate	Isocyanate de méthyle	Isocianato de metilo	X		
630-20-6	1,1,1,2-Tetrachloroethane	1,1,1,2-Tétrachloroéthane	1,1,1,2-Tetracloroetano	X	X	
636-21-5	o-Toluidine hydrochloride	Chlorydrate de o-toluidine	o-Toluidina hidrocloruro	X		
639-58-7	Triphenyltin chloride	Chlorure de triphénylétain	Cloruro de trifenilestaño	X		
680-31-9	Hexamethylphosphoramide	Hexaméthylphosphoramide	Hexametilfosforamida	X		
684-93-5	N-Nitroso-N-methylurea	N-Nitroso-N-méthylurée	N-Nitroso-N-metilurea	X		
709-98-8	Propanil	Propanil	Propanilo	X		
759-73-9	N-Nitroso-N-ethylurea	N-Nitroso-N-éthylurée	N-Nitroso-N-etilurea	X		
759-94-4	Ethyl dipropylthiocarbamate	EPTC	Dipropiltiocarbamato de etilo	X		

* RETC list of chemicals for voluntary reporting in Section 5 of COA. Does not include Criteria Air Contaminants.

Appendix A – A Comparison of Chemicals Listed under 2002 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
764-41-0	1,4-Dichloro-2-butene	1,4-Dichloro-2-butène	1,4-Dicloro-2-buteno	X		
812-04-4	1,1-Dichloro-1,2,2-trifluoroethane (HCFC-123b)	1,1-Dichloro-1,2,2-trifluoroéthane (HCFC-123b)	1,1,-Dicloro-1,2,2-trifluoroetano (HCFC-123b)	X		
834-12-8	Ametryn	Amétryne	Ametrín	X		
842-07-9	C.I. Solvent Yellow 14	Indice de couleur Jaune de solvant 14	Amarillo 14 solvente	X	X	
872-50-4	N-Methyl-2-pyrrolidone	N-Méhyl-2-pyrrolidone	N-Metil2-pirrolidona	X	X	
924-16-3	N-Nitrosodi-n-butylamine	N-Nitrosodi-n-butylamine	N-Nitrosodi-n-butilamina	X		
924-42-5	N-Methylolacrylamide	N-(Hydroxyméthyl)acrylamide	N-Metilolacrilamida	X	X	
957-51-7	Diphenamid	Difénamide	Difenamida	X		
961-11-5	Tetrachlorvinphos	Tétrachlorvinphos	Tetraclorvinfos	X		
989-38-8	C.I. Basic Red 1	Indice de couleur Rouge de base 1	Rojo 1 básico	X	X	
1114-71-2	Pebulate	Pébulate	Pebulato	X		
1120-71-4	Propane sultone	Propanesultone	Propane sultone	X		
1134-23-2	Cycloate	Cycloate	Ciclolato	X		
1163-19-5	Decabromodiphenyl oxide	Oxyde de décabromodiphényle	Óxido de decabromodifenilo	X	X	
1300-71-6	Dimethyl phenol	Diméthylphénol	Dimetilfenol		X	
1313-27-5	Molybdenum trioxide	Trioxyde de molybdène	Trióxido de molibdeno	X	X	
1314-20-1	Thorium dioxide	Dioxyde de thorium	Dióxido de torio	X	X	
1319-77-3	Cresol (mixed isomers)	Crésol (mélange d'isomères)	Cresol (mezcla de isómeros)	X	X	
1320-18-9	2,4-D Propylene glycol butyl ether ester	(2,4-Dichlorophénoxy)acétate de 2-butoxyméthyléthyle	Ester de 2,4-D propilen glicolbutileter	X		
1330-20-7	Xylene (mixed isomers)	Xylène (mélange d'isomères)	Xileno (mezcla de isómeros)	X	X	
1332-21-4	Asbestos (friable form)	Amiante (forme friable)	Asbestos (friables)	X	X	X
1335-87-1	Hexachloronaphthalene	Hexachloronaphtalène	Hexacloronaftaleno	X		
1336-36-3	Polychlorinated biphenyls (PCBs)	Biphényles polychlorés (BPC)	Bifenilos policlorados (BPC)	X		X
1344-28-1	Aluminum oxide (fibrous forms)	Oxyde d'aluminium (formes fibreuses)	Óxido de aluminio (formas fibrosas)	X	X	
1464-53-5	Diepoxybutane	Diépoxybutane	Diepoxibutano	X		
1563-66-2	Carbofuran	Carbofuran	Carbofurano	X		
1582-09-8	Trifluralin	Trifuraline	Trifluralín	X		
1634-04-4	Methyl tert-butyl ether	Oxyde de tert-butyle et de méthyle	Éter metil terbutílico	X	X	
1649-08-7	1,2-Dichloro-1,1-difluoroethane (HCFC-132b)	1,2-Dichloro-1,1-difluoroéthane (HCFC-132b)	1,2-Dicloro-1,1-difluoroetano (HCFC-132b)	X		
1689-84-5	Bromoxynil	Bromoxynil	Bromoxinilo	X		
1689-99-2	Bromoxynil octanoate	Octanoate de 2,6-dibromo-4-cyanophényle	Bromoxinil octanoato	X		
1717-00-6	1,1-Dichloro-1-fluoroethane (HCFC-141b)	1,1-Dichloro-1-fluoroéthane (HCFC-141b)	1,1-Dicloro-1-fluoroetano (HCFC-141b)	X	X	X
1836-75-5	Nitrofen	Nitrofène	Nitrofén	X		
1861-40-1	Benfluralin	Benfluralin	Benfluralín	X		
1897-45-6	Chlorothalonil	Chlorothalonil	Clorotalonil	X		
1910-42-5	Paraquat dichloride	Paraquat-dichlorure	Dicloruro de Paracuat	X		
1912-24-9	Atrazine	Atrazine	Atracina	X		
1918-00-9	Dicamba	Dicamba	Dicamba	X		
1918-02-1	Picloram	Piclorame	Picloram	X		
1918-16-7	Propachlor	Propachlore	Propaclor	X		
1928-43-4	2,4-D 2-Ethylhexyl ester	2,4-Dichlorophénoxyacétate de 2-éthylhexyle	2,4-D 2-Etilexil ester	X		
1929-73-3	2,4-D Butoxyethyl ester	2,4-Dichlorophénoxyacétate de 2-butoxyéthyle	2,4-D Butoxyetilester	X		
1929-82-4	Nitrapyrin	Nitrapyrine	Nitrapirina	X		
1937-37-7	C.I. Direct Black 38	Indice de couleur Noir direct 38	Negro 38	X		
1982-69-0	Sodium dicamba	3,6-Dichloro-o-anisate de sodium	Dicamba de sodio	X		
1983-10-4	Tributyltin fluoride	Fluorure de tributylétain	Fluoruro de tributilestaño	X		
2032-65-7	Methiocarb	Méthiocarbe	Metiocarb	X		
2155-70-6	Tributyltin methacrylate	Méthacrylate de tributylétain	Metacrilato de tributilestaño	X		
2164-07-0	Dipotassium endothall	Endothal-potassium	Endotal dipotásico	X		
2164-17-2	Fluometuron	Fluométuron	Fluometurón	X		

* RETC list of chemicals for voluntary reporting in Section 5 of COA. Does not include Criteria Air Contaminants.

Appendix A – A Comparison of Chemicals Listed under 2002 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
2212-67-1	Molinate	Molinate	Molinato	X		
2234-13-1	Octochloronaphthalene	Octochloronaphtalène	Octacloronaftaleno	X		
2300-66-5	Dimethylamine dicamba	Acide 3,6-dichloro-o-anisique, composé avec diméthylamine	Dicamba dimetilamina	X		
2303-16-4	Diallate	Diallate	Diallate	X		
2303-17-5	Triallate	Triallate	Trialato	X		
2312-35-8	Propargite	Propargite	Propargita	X		
2385-85-5	Mirex	Mirex	Mirex			X
2439-01-2	Chinomethionat	Chinométionate	Quinometionato	X		
2439-10-3	Dodine	Dodine	Dodina	X		
2524-03-0	Dimethyl chlorothiophosphate	Thiophosphorochloridate de O,O-diméthyle	Clorotiofosfato de dimetilo	X		
2551-62-4	Sulfur hexachoride	Hexachlorure de soufre	Hexacloruro de azufre		X	X
2602-46-2	C.I. Direct Blue 6	Indice de couleur Bleu direct 6	Azul 6	X		
2655-15-4	2,3,5-Trimethylphenyl methylcarbamate	Méthylcarbamate de 2,3,5-triméthylphényle	Metilcarbamato de 2,3,5-trimetilfenilo	X		
2699-79-8	Sulfuryl fluoride	Fluorure de sulfuryle	Fluoruro de sulfurilo	X		
2702-72-9	2,4-D Sodium salt	2,4-Dichlorophénoxyacetate de sodium	Sal sódica del 2,4-D	X		
2832-40-8	C.I. Disperse Yellow 3	Indice de couleur Jaune de dispersion 3	Amarillo 3 disperso	X	X	
2837-89-0	2-Chloro-1,1,1,2-tetrafluoroethane (HCFC-124)	2-Chloro-1,1,1,2-tétrafluoroéthane (HCFC-124)	2-Cloro-1,1,1,2-tetrafluoroetano (HCFC-124)	X	X	X
2971-38-2	2,4-D Chlorocrotyl ester	(2,4-Dichlorophénoxy)acétate de 4-chlorobutén-2-yle	Ester clorocrotílico del 2,4-D	X		
3118-97-6	C.I. Solvent Orange 7	Indice de couleur Orange de solvant 7	Naranja 7 solvente	X	X	
3383-96-8	Temephos	Téméphos	Temefos	X		
3653-48-3	Methoxone, sodium salt	Acide (4-chloro-2-méthylphenoxy)acétique, sel de sodium	Sal sódica de metoxona	X		
3761-53-3	C.I. Food Red 5	Indice de couleur Rouge alimentaire 5	Rojo 5 alimenticio	X		
4080-31-3	1-(3-Chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride	3-Chloroallylochlorure de méthénamine	Cloruro de 1-(3-Cloroalil)-3,5,7-triasa-1-azoniaadamantano	X		
4098-71-9	Isophorone diisocyanate	Diisocyanate d'isophorone	Diisocianatos de isoforona	**	X	
4170-30-3	Crotonaldehyde	Crotonaldéhyde	Crotonaldehído	X	X	
4549-40-0	N-Nitrosomethylvinylamine	N-Nitrosométhylvinylamine	N-Nitrosometilvinilamina	X		
4680-78-8	C.I. Acid Green 3	Indice de couleur Vert acide 3	Verde 3 ácido	X	X	
5124-30-1	1,1-Methylenebis(4-isocyanatocyclohexane)	1,1-Méthylènebis(4-isocyanatocyclohexane)	1,1-Metilenebis(4-isocianto de ciclohexano)		X	
5234-68-4	Carboxin	Carboxine	Carboxina	X		
5598-13-0	Chlorpyrifos methyl	Chlorpyrifos-méthyl	Metil clorpirifos	X		
5902-51-2	Terbacil	Terbacile	Metilterbacilo	X		
6459-94-5	C.I. Acid Red 114	Indice de couleur Rouge acide 114	Índice de color rojo ácido 114	X		
7287-19-6	Prometryn	Prométryne	Prometrín	X		
7311-27-5	2-(2-(2-(2-(p-Nonylphenoxy) ethoxy)ethoxy)ethoxy) ethanol	2-(2-(2-(2-(p-Nonylphénoxy) éthoxy)éthoxy)éthoxy) éthanol	Etanol 2-(2-(2-(2-(p-nonilfenoxi) etoxi)etoxi)etoxi)		X	
7429-90-5	Aluminum (fume or dust)	Aluminium (fumée ou poussière)	Aluminio (humo o polvo)	X	X	
7439-92-1	Lead	Plomb	Plomo	X		
7439-96-5	Manganese	Manganèse	Manganeso	X		
7439-97-6	Mercury	Mercure	Mercurio	X		
7440-02-0	Nickel	Nickel	Níquel	X		
7440-22-4	Silver	Argent	Plata	X		
7440-28-0	Thallium	Thallium	Talio	X		
7440-36-0	Antimony	Antimoine	Antimonio	X		
7440-38-2	Arsenic	Arsenic	Arsénico	X		
7440-39-3	Barium	Baryum	Bario	X		
7440-41-7	Beryllium	Béryllium	Berilio	X		
7440-43-9	Cadmium	Cadmium	Cadmio	X		
7440-47-3	Chromium	Chrome	Cromo	X		
7440-48-4	Cobalt	Cobalt	Cobalto	X		
7440-50-8	Copper	Cuivre	Cobre	X		
7440-62-2	Vanadium	Vanadium	Vanadio	X	X	

* RETC list of chemicals for voluntary reporting in Section5V of COA. Does not include Criteria Air Contaminants.

** Reported under TRI as part of diisocyanates group.

Appendix A – A Comparison of Chemicals Listed under 2002 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
7440-66-6	Zinc (fume or dust)	Zinc (fumée ou poussière)	Zinc (humo o polvo)	X		
7550-45-0	Titanium tetrachloride	Tétrachlorure de titane	Tetracloruro de titanio	X	X	
7632-00-0	Sodium nitrite	Nitrite de sodium	Nitrato de sodio	X	X	
7637-07-2	Boron trifluoride	Trifluorure de bore	Trifluoruro de boro	X	X	
7647-01-0	Hydrochloric acid	Acide chlorhydrique	Ácido clorhídrico	X	X	
7664-39-3	Hydrogen fluoride	Fluorure d'hydrogène	Ácido fluorhídrico	X	X	
7664-41-7	Ammonia	Ammoniac	Amoniaco	X	X	
7664-93-9	Sulfuric acid	Acide sulfurique	Ácido sulfúrico	X	X	
7681-49-4	Sodium fluoride	Fluorure de sodium	Fluoro de sodio		X	
7696-12-0	Tetramethrin	Tétraméthrine	Tetrametrina	X		
7697-37-2	Nitric acid	Acide nitrique	Ácido nítrico	X	X	
7723-14-0	Phosphorus (yellow or white)	Phosphore (jaune ou blanc)	Fósforo (amarillo o blanco)	X	X	
7726-95-6	Bromine	Brome	Bromo	X	X	
7758-01-2	Potassium bromate	Bromate de potassium	Bromato de potasio	X	X	
7782-41-4	Fluorine	Fluor	Fluor	X	X	
7782-49-2	Selenium	Sélénium	Selenio	X		
7782-50-5	Chlorine	Chlore	Cloro	X	X	
7783-06-4	Hydrogen sulfide	Hydrogène sulfuré	Ácido sulfhídrico		X	X
7786-34-7	Mevinphos	Mevinphos	Mevinfos	X		
7789-75-5	Calcium fluoride	Fluorure de calcium	Fluoro de calcio		X	
7803-51-2	Phosphine	Phosphine	Fosfina	X		
8001-35-2	Toxaphene	Toxaphène	Toxafeno	X		X
8001-58-9	Creosote	Créosote	Creosota	X		
9006-42-2	Metiram	Métirame	Metiram	X		
9016-45-9	Nonylphenol polyethylene glycol ether	Nonylphénol, éther de polyéthylèneglycol	Éter de nonilfenol polietilenglicol		X	
9016-87-9	Polymeric diphenylmethane diisocyanate	Diisocyanate de diphénylméthane (polymérisé)	Difenilmetano diisocianato polimérico	**	X	
10028-15-6	Ozone	Ozone	Ozono	X		
10034-93-2	Hydrazine sulfate	Sulfate d'hydrazine	Sulfato de hidracina	X		
10049-04-4	Chlorine dioxide	Dioxyde de chlore	Dióxido de cloro	X	X	X
10061-02-6	trans-1,3-Dichloropropene	(E)-1,3-Dichloroprop-1-ène	Trans-1,3-dicloropropeno	X		
10102-43-9	Nitric oxide	Monoxyde d'azote	Oxido nítrico			X
10102-44-0	Nitrogen dioxide	Dioxyde d'azote	Bióxido de nitrógeno			X
10294-34-5	Boron trichloride	Trichlorure de bore	Tricloruro de Boro	X		
10453-86-8	Resmethrin	Resméthrine	Resmetrina	X		
12122-67-7	Zineb	Zinèbe	Zineb	X		
12427-38-2	Maneb	Manèbe	Maneb	X		
13194-48-4	Ethoprop	Éthoprophos	Etoprofos	X		
13356-08-6	Fenbutatin oxide	Fenbutatin oxyde	Óxido de fenbutaestaño	X		
13463-40-6	Iron pentacarbonyl	Fer-pentacarbonyle	Pentacarbonilo de hierro	X	X	
13474-88-9	1,1-Dichloro-1,2,2,3,3-pentafluoropropane (HCFC-225cc)	1,1-Dichloro-1,2,2,3,3-pentafluoropropane (HCFC-225cc)	1,1-Dicloro-1,2,2,3,3-pentafluoropropano (HCFC-225cc)	X		
13684-56-5	Desmedipham	Desmédiphame	Desmedifam	X		
14484-64-1	Ferbam	Ferbame	Ferban	X		
15646-96-5	2,4,4-Trimethylhexamethylene diisocyanate	Diisocyanate 2,4,4-Triméthylhexaméthylène	2,4,4-Trimethilhexametileno diisocyanato	**	X	
15972-60-8	Alachlor	Alachlore	Alaclor	X		
16071-86-6	C.I. Direct Brown 95	Indice de couleur Brun direct 95	Café 95	X		
16543-55-8	N-Nitrosonornicotine	N-Nitrosonornicotine	N-Nitrosonornicotina	X		
16938-22-0	2,2,4-Trimethylhexamethylene diisocyanate	Diisocyanate 2,2,4-Triméthylhexaméthylène	2,2,4-Trimethilhexametileno diisocyanato	**	X	
17804-35-2	Benomyl	Bénomyl	Benomil	X		
19044-88-3	Oryzalin	Oryzalin	Orizalina	X		
19666-30-9	Oxydiazon	Oxydiazon	Oxidiazono	X		

* RETC list of chemicals for voluntary reporting in Section V of COA. Does not include Criteria Air Contaminants.
** Reported under TRI as part of diisocyanates group.

Appendix A – A Comparison of Chemicals Listed under 2002 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
20325-40-0	3,3'-Dimethoxybenzidine dihydrochloride	Dichlorure de 3,3'-diméthoxybiphényl-4,4'-ylènediammonium	Dicloruro de 3,3'-dimetoxibencidina	X		
20354-26-1	Methazole	Méthazole	Metazol	X		
20427-84-3	2-(2-(p-Nonylphenoxy)ethoxy) ethanol	2-(2-(p-Nonylphénoxy) éthoxy) éthanol	Etanol 2-(2-(p-nonilfenoxi) etoxi)		X	
20816-12-0	Osmium tetroxide	Tétroxyde d'osmium	Tetróxido de osmio	X		
20859-73-8	Aluminum phosphide	Phospure d'aluminium	Fosfuro de aluminio	X		
21087-64-9	Metribuzin	Métribuzine	Metribucina	X		
21725-46-2	Cyanazine	Cyanazine	Cianacina	X		
22781-23-3	Bendiocarb	Bendiocarbe	Bendiocarb	X		
23564-05-8	Thiophanate-methyl	Thiophanate-méthyl	Metiltiofanato	X		
23564-06-9	Thiophanate ethyl	Thiophanate	Etiltiofanato	X		
23950-58-5	Pronamide	Pronamide	Pronamida	X		
25154-52-3	n-Nonylphenol (mixed isomers)	n-Nonylphénol (mélange d'isomères)	n-Nonilfenol (mezcla de isómeros)		X	
25311-71-1	Isofenphos	Isophenphos	Isofenfos	X		
25321-14-6	Dinitrotoluene (mixed isomers)	Dinitrotoluène (mélange d'isomères)	Dinitrotolueno (mezcla de isómeros)	X	X	
25321-22-6	Dichlorobenzene (mixed isomers)	Dichlorobenzène (mélange d'isomères)	Diclorobenceno (mezcla de isómeros)	X		
25376-45-8	Diaminotoluene (mixed isomers)	Diaminotoluène (mélange d'isomères)	Diaminotolueno (mezcla de D594+D565)	X		
26002-80-2	Phenothrin	Phénothrine	Fenotrina	X		
26027-38-3	p-Nonylphenol polyethylene glycol ether	p-Nonylphénol, éther de polyéthyèneglycol	Éter de p-nonilfenol polietilenglicol		X	
26471-62-5	Toluenediisocyanate (mixed isomers)	Toluènediisocyanate (mélange d'isomères)	Toluendiisocianatos (mezcla de isómeros)	X	X	X
26628-22-8	Sodium azide	Azide de sodium	Azida de Sodio	X		
26644-46-2	Triforine	Triforine	Triforina	X		
27177-05-5	Nonylphenol hepta(oxyethylene) ethanol	Nonylphénol, dérivé hepta(oxyéthylène)éthanol	Etanol nonilfenol heptaoxietileno		X	
27177-08-8	Nonylphenol nona(oxyethylene) ethanol	Nonylphénol, dérivé nona(oxyéthylène)éthanol	Etanol nonilfenol nonaoxietileno		X	
27314-13-2	Norflurazon	Norflurazon	Norfurazona	X		
27986-36-3	Nonylphenoxy ethanol	Nonylphénoxy éthanol	Etanol nonilfenoxi		X	
28057-48-9	d-trans-Allethrin	Alléthrine	d-trans-Alletrina	X		
28249-77-6	Thiobencarb	Diéthylthiocarbamate de S-4-chlorobenzyle	Tiobencarb	X		
28407-37-6	C.I. Direct Blue 218	Indice de couleur Bleu direct 218	Índice de color Azul directo 218	X	X	
28679-13-2	Ethoxynonyl benzene	Éthoxynonyl benzène	Benceno etoxinonil		X	
29082-74-4	Octachlorostyrene	Octachlorostyrène	Octaclorostireno	X		
29232-93-7	Pirimiphos methyl	Pirimiphos-méthyl	Metilpirimifos	X		
30560-19-1	Acephate	Acéphate	Acefato	X		
31218-83-4	Propetamphos	Propétamphos	Propetamfos	X		
33089-61-1	Amitraz	Amitraze	Amitraz	X		
34014-18-1	Tebuthiuron	Tébuthiuron	Tebutiurón	X		
34077-87-7	Dichlorotrifluoroethane (HCFC-123 and isomers)	Dichlorotrifluoroéthane	Diclorotrifluoroetano	X	X	X
35367-38-5	Diflubenzuron	Diflubenzuron	Diflubenzurón	X		
35400-43-2	Sulprofos	Sulprofos	Sulprofos	X		
35554-44-0	Imazalil	Imazalil	Imazalil	X		
35691-65-7	1-Bromo-1-(bromomethyl)-1,3-propanedicarbonitrile	2-Bromo-2-(bromométhyl)pentanedinitrile	1-Bromo-1-(bromometil)-1,3-propanedicarbonitrilo	X		
37251-69-7	Oxirane, methyl-, polymer with oxirane, mono(nonylphenyl)ether	Oxirane, méthyl-, polymérisé avec l'oxirane, dérivé éther monononylphénylique	Oxireno, metil-, polímero con oxireno, mono(nonifenil) éter		X	
38727-55-8	Diethatyl ethyl	N-(chloroacetyl)-N-(2,6-diethylphenyl) glycinate d'éthyle	Etildietatil	X		
39156-41-7	2,4-Diaminoanisole sulfate	Sulfate de 2,4-diaminoanisole	Sulfato de 2,4-diaminoanisol	X		
39300-45-3	Dinocap	Dinocap	Dinocap	X		
39515-41-8	Fenpropathrin	Fenpropathrine	Fenpropatrina	X		
40487-42-1	Pendimethalin	Pendiméthaline	Pendimetalina	X		
41198-08-7	Profenofos	Profénofos	Profenofos	X		
41766-75-0	3,3'-Dimethylbenzidine dihydrofluoride	Dihydrofluorure de 3,3'-diméthylbenzidine	Difluoruro de 3,3´-dimetilbencidina	X		
41834-16-6	HCFC-122 and all isomers	HCFC-122 et tous ses isomères	HCFC-122 e isómeros		X	

* RETC list of chemicals for voluntary reporting in Section 5 of COA. Does not include Criteria Air Contaminants.

Appendix A – A Comparison of Chemicals Listed under 2002 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
42874-03-3	Oxyfluorfen	Oxyfluorfène	Oxifluorfeno	X		
43121-43-3	Triadimefon	Triadiméfon	Triadimefón	X		
50471-44-8	Vinclozolin	Vinclozoline	Vinclosolín	X		
51235-04-2	Hexazinone	Hexazinone	Hexacinona	X		
51338-27-3	Diclofop methyl	Diclofop-méthyl	Metildiclofop	X		
51630-58-1	Fenvalerate	Fenvalérate	Fenvalerato	X		
52645-53-1	Permethrin	Perméthrine	Permitrina	X		
53404-19-6	Bromacil, lithium salt	Bromacil, sel de lithium	Sal de litio bromacílica	X		
53404-37-8	2,4-D 2-Ethyl-4-methylpentyl ester	(2,4-Dichlorophénoxy)acétate de 2-éthyl-4-méthylpentyle	2,4-D 2-Etil-4-metilpentil éster	X		
53404-60-7	Dazomet, sodium salt	Dazomet, sel de sodium	Sal de sodio diazomética	X		
55290-64-7	Dimethipin	Diméthipin	Dimetipina	X		
55406-53-6	3-Iodo-2-propynyl butylcarbamate	Butylcarbamate de 3-iodo-2-propynyle	3-yodo-2-propinil butilcarbamato	X		
57213-69-1	Triclopyr triethylammonium salt	Acide [(3,5,6-trichloro-2-pyridyl)oxy]acétique,	Sal de triclopir trietilamonio	X		
59669-26-0	Thiodicarb	Thiodicarbe	Tiodicarb	X		
60168-88-9	Fenarimol	Fénarimol	Fenarimol	X		
60207-90-1	Propiconazole	Propiconazole	Propiconazol	X		
62476-59-9	Acifluorfen, sodium salt	Acifluorfen, sel de sodium	Sal de sodio de acifluorfeno	X		
63938-10-3	Chlorotetrafluoroethane (HCFC-124 and isomers)	Chlorotétrafluoroéthane	Clorotetrafluoroetano	X	X	
64902-72-3	Chlorsulfuron	Chlorsulfuron	Clorsulfurón	X		
64969-34-2	3,3‘-Dichlorobenzidine sulfate	Dihydrogénobis(sulfate) de 3,3‘-dichlorobenzidine	Sulfato de 3,3´-diclorobencidina	X		
66441-23-4	Fenoxaprop ethyl	Fénoxaprop-p-éthyl	Etilfenoxaprop	X		
67485-29-4	Hydramethylnon	Hydraméthylnon	Hidrametilnona	X		
68085-85-8	Cyhalothrin	Cyhalothrine	Cialotrina	X		
68359-37-5	Cyfluthrin	Cyfluthrine	Ciflutrina	X		
68920-70-7	Polychlorinated alkanes (C6-C18)	Alcanes poychlorés (C8-C18)	Alcanos policlorinados (C8-C18)		X	
69409-94-5	Fluvalinate	Fluvalinate	Fluvalinato	X		
69806-50-4	Fluazifop butyl	Fluazifop-butyl	Butil flucifop	X		
71751-41-2	Abamectin	Abamectine	Abamectina	X		
72178-02-0	Fomesafen	Fomésafène	Fomesafén	X		
72490-01-8	Fenoxycarb	Fénoxycarbe	Fenoxicarb	X		
74051-80-2	Sethoxydim	Séthoxydime	Setoxidime	X		
76578-14-8	Quizalofop-ethyl	Quizalofop	Etilquizalofop	X		
77501-63-4	Lactofen	Lactofène	Lactofén	X		
82657-04-3	Bifenthrin	Bifenthrine	Bifentrina	X		
84852-15-3	Nonylphenol, industrial	Nonylphénol de qualité industrielle	Nonilfenol industrial		X	
88671-89-0	Myclobutanil	Myclobutanil	Miclobutanilo	X		
90454-18-5	Dichloro-1,1,2-trifluoroethane	Dichloro-1,1,2-trifluoroéthane	Dicloro-1,1,2-trifluoroetano	X		
90982-32-4	Chlorimuron ethyl	Chlorimuron	Etil clorimurón	X		
101200-48-0	Tribenuron methyl	Tribénuron	Metiltribenurón	X		
111512-56-2	1,1-Dichloro-1,2,3,3,3-pentafluoropropane (HCFC-225eb)	1,1-Dichloro-1,2,3,3,3-pentafluoropropane (HCFC-225eb)	1,1-Dicloro-1,2,3,3,3-pentafluoropropano (HCFC-225eb)	X		
111984-09-9	3,3,-Dimethoxybenzidine hydrochloride	Hydrochlorure de 3,3‘-ddiméthoxybenzidine	Hidrocloruro de 3,3´-dimetoxibencidina	X		
127564-92-5	Dichloropentafluoropropane	Dichloropentafluoropropane	Dicloropentafluoropropane	X		
128903-21-9	2,2-Dichloro-1,1,1,3,3-pentafluoropropane (HCFC-225aa)	2,2-Dichloro-1,1,1,3,3-pentafluoropropane (HCFC-225aa)	2,2-Dicloro-1,1,1,3,3-pentafluoropropano (HCFC-225aa)	X		
136013-79-1	1,3-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC-225ea)	1,3-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC-225ea)	1,3-Dicloro-1,1,2,3,3-pentafluoropropano (HCFC-225ea)	X		
	Antimony and its compounds**	Antimoine (et ses composés)	Antimonio y compuestos	X	X	
	Arsenic and its compounds	Arsenic (et ses composés)	Arsénico y compuestos	X	X	X
	Barium and its compounds	Baryum (et ses composés)	Bario y compuestos	X		
	Beryllium and its compounds	Béryllium (et ses composés)	Berilio y compuestos	X		
	Cadmium and its compounds	Cadmium (et ses composés)	Cadmio y compuestos	X	X	X
	Chlorophenols	Chlorophénols	Clorofenoles	X		

*   RETC list of chemicals for voluntary reporting in Section 5 of COA. Does not include Criteria Air Contaminants.
** Elemental compounds are reported separately from their respective element in TRI and RETC and aggregated with it in NPRI.

Appendix A – A Comparison of Chemicals Listed under 2002 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
	Chromium and its compounds	Chrome (et ses composés)	Cromo y compuestos	X	X	X
	Cobalt and its compounds	Cobalt (et ses composés)	Cobalto y compuestos	X	X	
	Copper and its compounds	Cuivre (et ses composés)	Cobre y compuestos	X	X	
	Cresol (mixed isomers)**	Crésol (mélange d'isomères)	Cresol (mezcla de isómeros)	X	X	
	Cyanide compounds	Cyanure (et ses composés)	Cianuro y compuestos	X	X	X
	Diisocyanates	Diisocyanates	Diisocianatos	X		
	Dioxins	Dioxines	Dioxinas			X
	Ethylenebisdithiocarbamic acid, salts and esters	Acide, sels et éthers éthylènebisdithiocarbamiques	Ácido etilenobisditiocarbámico, sales y ésteres	X		
	Furans	Furanes	Furanos			X
	Glycol ethers	Éthers glycoliques	Éteres glicólicos	X		
	Hydrobromofluorocarbons	Hydrobromofluorocarbures	Hidrobromofluorocarbonos			X
	Hydrofluorocarbons	Hydrofluorocarbures	Hidrofluorocarbonos			X
	Lead and its compounds	Plomb (et ses composés)	Plomo y compuestos	X	X	X
	Manganese and its compounds	Manganèse (et ses composés)	Manganeso y compuestos	X	X	
	Mercury and its compounds	Mercure (et ses composés)	Mercurio y compuestos	X	X	X
	Nickel and its compounds	Nickel (et ses composés)	Níquel y compuestos	X	X	X
	Nicotine and salts	Nicotine et sels	Nicotina y sales	X		
	Nitrate compounds	Composés de nitrate	Compuestos nitrados	X	X	
	Perfluorocarbons	Perfluorocarbures	Perfluorocarbonos			X
	Polybrominated biphenyls	Biphényles polybromés	Bifenilos polibromados	X		
	Polychlorinated alkanes (C10-C13)	Alcanes poychlorés (C10-C13)	Alcanos policlorinados (C10-C13)	X	X	
	Polycyclic aromatic compounds	Composés aromatiques polycycliques	Compuestos aromáticos policíclicos	X		
	Selenium and its compounds	Sélénium (et ses composés)	Selenio y compuestos	X	X	
	Silver and its compounds	Argent (et ses composés)	Plata y compuestos	X	X	
	Strychnine and salts	Strychnine et sels	Estricnina y sales	X		
	Thallium and its compounds	Thallium (et ses composés)	Talio y compuestos	X		
	Vanadium compounds	Vanadium et ses composès	Vanadio y compuestos	X	X	
	Warfarin and salts	Warfarine et sels	Warfarina y sales	X		X
	Xylenes***	Xylènes	Xilenos	X	X	
	Zinc and its compounds	Zinc (et ses composés)	Zinc y compuestos	X	X	

* RETC list of chemicals for voluntary reporting in Section 5 of COA. Does not include Criteria Air Contaminants.
** Cresol isomers are reported separately in TRI and aggregated in NPRI.
*** Xylene isomers are reported separately in TRI and aggregated in NPRI.

Appendix B – Matched Chemicals—Listed in both TRI and NPRI, 2002

CAS Number	In 1995–2002 Matched Data Set	Special Chemical Group	Chemical Name	Substance	Sustancia
50-00-0	X	c,p	Formaldehyde	Formaldéhyde	Formaldehído
55-63-0	X		Nitroglycerin	Nitroglycérine	Nitroglicerina
56-23-5	X	c,p,t	Carbon tetrachloride	Tétrachlorure de carbone	Tetracloruro de carbono
62-53-3	X	p	Aniline	Aniline	Anilina
62-56-6	X	c,p	Thiourea	Thio-urée	Tiourea
64-18-6			Formic acid	Acide formique	Ácido fórmico
64-67-5	X	c,p	Diethyl sulfate	Sulfate de diéthyle	Sulfato de dietilo
64-75-5		p	Tetracycline hydrochloride	Chlorhydrate de tétracycline	Clorhidrato de tetraciclina
67-56-1	X		Methanol	Méthanol	Metanol
67-66-3	X	c,p	Chloroform	Chloroforme	Cloroformo
67-72-1	X	c,p	Hexachloroethane	Hexachloroéthane	Hexacloroetano
68-12-2			N,N-Dimethylformamide	N,N-Diméthyl formamide	N.N-Dimetilformamida
70-30-4			Hexachlorophene	Hexachlorophène	Hexaclorofeno
71-36-3	X		n-Butyl alcohol	Butan-1-ol	Alcohol n-butílico
71-43-2	X	c,p,t	Benzene	Benzène	Benceno
74-83-9	X	p,t	Bromomethane	Bromométhane	Bromometano
74-85-1	X		Ethylene	Éthylène	Etileno
74-87-3	X	p	Chloromethane	Chlorométhane	Clorometano
74-88-4	X	p	Methyl iodide	Iodométhane	Yoduro de metilo
74-90-8	X		Hydrogen cyanide	Cyanure d'hydrogène	Ácido cianhídrico
75-00-3	X	p	Chloroethane	Chloroéthane	Cloroetano
75-01-4	X	c,p,t	Vinyl chloride	Chlorure de vinyle	Cloruro de vinilo
75-05-8	X		Acetonitrile	Acétonitrile	Acetonitrilo
75-07-0	X	c,p,t	Acetaldehyde	Acétaldéhyde	Acetaldehído
75-09-2	X	c,p,t	Dichloromethane	Dichlorométhane	Diclorometano
75-15-0	X	p	Carbon disulfide	Disulfure de carbone	Disulfuro de carbono
75-21-8	X	c,p,t	Ethylene oxide	Oxyde d'éthylène	Óxido de etileno
75-35-4	X	t	Vinylidene chloride	Chlorure de vinylidène	Cloruro de vinilideno
75-44-5	X		Phosgene	Phosgène	Fosgeno
75-45-6		t	Chlorodifluoromethane (HCFC-22)	Chlorodifluorométhane (HCFC-22)	Clorodifluorometano (HCFC-22)
75-56-9	X	c,p	Propylene oxide	Oxyde de propylène	Óxido de propileno
75-63-8		t	Bromotrifluoromethane (Halon 1301)	Bromotrifluorométhane (Halon 1301)	Bromotrifluorometano (Halon 1301)
75-65-0	X		tert-Butyl alcohol	2-Méthylpropan-2-ol	Alcohol terbutílico
75-68-3			1-Chloro-1,1-difluoroethane (HCFC-142b)	1-Chloro-1,1-difluoroéthane (HCFC-142b)	1-Cloro-1,1-difluoroetano (HCFC-142b)
75-69-4		t	Trichlorofluoromethane (CFC-11)	Trichlorofluorométhane (CFC-11)	Triclorofluorometano (CFC-11)
75-71-8		t	Dichlorodifluoromethane (CFC-12)	Dichlorodifluorométhane (CFC-12)	Diclorodifluorometano (CFC-12)
75-72-9		t	Chlorotrifluoromethane (CFC-13)	Chlorotrifluorométhane (CFC-13)	Clorotrifluorometano (CFC-13)
76-01-7			Pentachloroethane	Pentachloroéthane	Pentacloroetano
76-14-2		t	Dichlorotetrafluoroethane (CFC-114)	Dichlorotétrafluoroéthane (CFC-114)	Diclorotetrafluoroetano (CFC-114)
76-15-3		t	Monochloropentafluoroethane (CFC-115)	Chloropentafluoroéthane (CFC-115)	Cloropentafluoroetano (CFC-115)
77-47-4	X		Hexachlorocyclopentadiene	Hexachlorocyclopentadiène	Hexaclorciclopentadieno
77-73-6			Dicyclopentadiene	Dicyclopentadiène	Dicloropentadieno
77-78-1	X	c,p	Dimethyl sulfate	Sulfate de diméthyle	Sulfato de dimetilo
78-84-2	X		Isobutyraldehyde	Isobutyraldéhyde	Isobutiraldehído
78-87-5	X	p	1,2-Dichloropropane	1,2-Dichloropropane	1,2-Dicloropropano

c = Known or suspected carcinogen.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.

Appendix B – Matched Chemicals—Listed in both TRI and NPRI, 2002 (*continued*)

CAS Number	In 1995–2002 Matched Data Set	Special Chemical Group	Chemical Name	Substance	Sustancia
78-92-2	X		sec-Butyl alcohol	Butan-2-ol	Alcohol sec-butílico
78-93-3	X		Methyl ethyl ketone	Méthyléthylcétone	Metil etil cetona
79-00-5	X	p	1,1,2-Trichloroethane	1,1,2-Trichloroéthane	1,1,2-Tricloroetano
79-01-6	X	c,p,t	Trichloroethylene	Trichloroéthylène	Tricloroetileno
79-06-1	X	c,p	Acrylamide	Acrylamide	Acrilamida
79-10-7	X		Acrylic acid	Acide acrylique	Ácido acrílico
79-11-8	X		Chloroacetic acid	Acide chloroacétique	Ácido cloroacético
79-21-0	X		Peracetic acid	Acide peracétique	Ácido peracético
79-34-5	X	p	1,1,2,2-Tetrachloroethane	1,1,2,2-Tétrachloroéthane	1,1,2,2-Tetracloroetano
79-46-9	X	c,p	2-Nitropropane	2-Nitropropane	2-Nitropropano
80-05-7	X		4,4'-Isopropylidenediphenol	p,p'-Isopropylidènediphénol	4,4'-Isopropilidenodifenol
80-15-9	X		Cumene hydroperoxide	Hydroperoxyde de cumène	Cumeno hidroperóxido
80-62-6	X		Methyl methacrylate	Méthacrylate de méthyle	Metacrilato de metilo
81-88-9	X	p	C.I. Food Red 15	Indice de couleur Rouge alimentaire 15	Rojo 15 alimenticio
84-74-2	X		Dibutyl phthalate	Phtalate de dibutyle	Dibutil ftalato
85-44-9	X		Phthalic anhydride	Anhydride phtalique	Anhídrido ftálico
86-30-6	X	p	N-Nitrosodiphenylamine	N-Nitrosodiphénylamine	N-Nitrosodifenilamina
90-43-7	X	p	2-Phenylphenol	o-Phénylphénol	2-Fenilfenol
90-94-8	X	c,p	Michler's ketone	Cétone de Michler	Cetona Michler
91-08-7	X	c	Toluene-2,6-diisocyanate	Toluène-2,6-diisocyanate	Toluen-2,6-diisocianato
91-20-3	X		Naphthalene	Naphtalène	Naftaleno
91-22-5	X	p	Quinoline	Quinoléine	Quinoleína
92-52-4	X		Biphenyl	Biphényle	Bifenilo
94-36-0	X		Benzoyl peroxide	Peroxyde de benzoyle	Peróxido de benzoilo
94-59-7	X	c,p	Safrole	Safrole	Safrol
95-50-1	X		1,2-Dichlorobenzene	o-Dichlorobenzène	1,2-Diclorobenceno
95-63-6	X		1,2,4-Trimethylbenzene	1,2,4-Triméthylbenzène	1,2,4-Trimetilbenceno
95-80-7	X	c,p	2,4-Diaminotoluene	2,4-Diaminotoluène	2,4-Diaminotolueno
96-09-3	X	c,p	Styrene oxide	Oxyde de styrène	Óxido de estireno
96-33-3	X		Methyl acrylate	Acrylate de méthyle	Acrilato de metilo
96-45-7	X	c,p	Ethylene thiourea	Imidazolidine-2-thione	Etilén tiourea
98-82-8	X		Cumene	Cumène	Cumeno
98-86-2			Acetophenone	Acétophénone	Acetofenona
98-88-4	X		Benzoyl chloride	Chlorure de benzoyle	Cloruro de benzoilo
98-95-3	X	c,p	Nitrobenzene	Nitrobenzène	Nitrobenceno
100-01-6			p-Nitroaniline	p-Nitroaniline	p-Nitroanilina
100-02-7	X		4-Nitrophenol	p-Nitrophénol	4-Nitrofenol
100-41-4	X	c	Ethylbenzene	Éthylbenzène	Etilbenceno
100-42-5	X	c	Styrene	Styrène	Estireno
100-44-7	X	c,p	Benzyl chloride	Chlorure de benzyle	Cloruro de bencilo
101-14-4	X	c,p	4,4'-Methylenebis(2-chloroaniline)	p,p'-Méthylènebis(2-chloroaniline)	4,4'-Metilenobis(2-cloroanilina)
101-77-9	X	c,p	4,4'-Methylenedianiline	p,p'-Méthylènedianiline	4,4'-Metilenodianilina
106-46-7	X	c,p	1,4-Dichlorobenzene	p-Dichlorobenzène	1,4-Diclorobenceno
106-50-3	X		p-Phenylenediamine	p-Phénylènediamine	p-Fenilenodiamina
106-51-4	X	c	Quinone	p-Quinone	Quinona

c = Known or suspected carcinogen.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.

Appendix B – Matched Chemicals—Listed in both TRI and NPRI, 2002 (*continued*)

CAS Number	In 1995–2002 Matched Data Set	Special Chemical Group	Chemical Name	Substance	Sustancia
106-88-7	X	c	1,2-Butylene oxide	1,2-Époxybutane	Óxido de 1,2-butileno
106-89-8	X	c,p,t	Epichlorohydrin	Épichlorohydrine	Epiclorohidrina
106-99-0	X	c,p,t	1,3-Butadiene	Buta-1,3-diène	1,3-Butadieno
107-02-8		t	Acrolein	Acroléine	Acroleína
107-05-1	X		Allyl chloride	Chlorure d'allyle	Cloruro de alilo
107-06-2	X	c,p,t	1,2-Dichloroethane	1,2-Dichloroéthane	1,2-Dicloroetano
107-13-1	X	c,p,t	Acrylonitrile	Acrylonitrile	Acrilonitrilo
107-18-6	X		Allyl alcohol	Alcool allylique	Alcohol alílico
107-19-7			Propargyl alcohol	Alcool propargylique	Alcohol propargílico
107-21-1	X		Ethylene glycol	Éthylèneglycol	Etilén glicol
108-05-4	X	c	Vinyl acetate	Acétate de vinyle	Acetato de vinilo
108-10-1	X		Methyl isobutyl ketone	Méthylisobutylcétone	Metil isobutil cetona
108-31-6	X		Maleic anhydride	Anhydride maléique	Anhídrido maleico
108-88-3	X	p	Toluene	Toluène	Tolueno
108-90-7	X		Chlorobenzene	Chlorobenzène	Clorobenceno
108-93-0			Cyclohexanol	Cyclohexanol	Ciclohexanol
108-95-2	X		Phenol	Phénol	Fenol
109-06-8			2-Methylpyridine	2-Méthylpyridine	2-Metilpiridina
109-86-4	X	p	2-Methoxyethanol	2-Méthoxyéthanol	2-Metoxietanol
110-54-3			n-Hexane	n-Hexane	n-Hexano
110-80-5	X	p	2-Ethoxyethanol	2-Éthoxyéthanol	2-Etoxietanol
110-82-7	X		Cyclohexane	Cyclohexane	Ciclohexano
110-86-1	X		Pyridine	Pyridine	Piridina
111-42-2	X		Diethanolamine	Diéthanolamine	Dietanolamina
115-07-1	X		Propylene	Propylène	Propileno
115-28-6		c,p	Chlorendic acid	Acide chlorendique	Ácido cloréndico
117-81-7	X	c,p,t	Di(2-ethylhexyl) phthalate	Phtalate de bis(2-éthylhexyle)	Di(2-etilhexil) ftalato
120-12-7	X		Anthracene	Anthracène	Antraceno
120-58-1	X	p	Isosafrole	Isosafrole	Isosafrol
120-80-9	X	c,p	Catechol	Catéchol	Catecol
120-82-1	X		1,2,4-Trichlorobenzene	1,2,4-Trichlorobenzène	1,2,4-Triclorobenceno
120-83-2	X		2,4-Dichlorophenol	2,4-Dichlorophénol	2,4-Diclorofenol
121-14-2	X	c,p	2,4-Dinitrotoluene	2,4-Dinitrotoluène	2,4-Dinitrotolueno
121-44-8			Triethylamine	Triéthylamine	Trietilamina
121-69-7	X		N,N-Dimethylaniline	N,N-Diméthylaniline	N,N-Dimetilanilina
122-39-4			Diphenylamine	Dianiline	Difenilamina
123-31-9	X		Hydroquinone	Hydroquinone	Hidroquinona
123-38-6	X		Propionaldehyde	Propionaldéhyde	Propionaldehído
123-63-7			Paraldehyde	Paraldéhyde	Paraldehído
123-72-8	X		Butyraldehyde	Butyraldéhyde	Butiraldehído
123-91-1	X	c,p	1,4-Dioxane	1,4-Dioxane	1,4-Dioxano
124-40-3			Dimethylamine	Diméthylamine	Dimetilamina
127-18-4	X	c,p,t	Tetrachloroethylene	Tétrachloroéthylène	Tetracloroetileno
131-11-3	X		Dimethyl phthalate	Phtalate de diméthyle	Dimetil ftalato
139-13-9	X	c,p	Nitrilotriacetic acid	Acide nitrilotriacétique	Ácido nitrilotriacético

c = Known or suspected carcinogen.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.

Appendix B – Matched Chemicals—Listed in both TRI and NPRI, 2002 (*continued*)

CAS Number	In 1995–2002 Matched Data Set	Special Chemical Group	Chemical Name	Substance	Sustancia
140-88-5	X	c,p	Ethyl acrylate	Acrylate d'éthyle	Acrilato de etilo
141-32-2	X		Butyl acrylate	Acrylate de butyle	Acrilato de butilo
149-30-4			2-Mercaptobenzothiazole	Benzothiazole-2-thiol	2-Mercaptobenzotiazol
156-62-7	X		Calcium cyanamide	Cyanamide calcique	Cianamida de calcio
302-01-2	X	c,p	Hydrazine	Hydrazine	Hidracina
353-59-3		t	Bromochlorodifluoromethane (Halon 1211)	Bromochlorodifluorométhane (Halon 1211)	Bromoclorodifluorometano (Halon 1211)
534-52-1	X		4,6-Dinitro-o-cresol	4,6-Dinitro-o-crésol	4,6-Dinitro-o-cresol
541-41-3	X		Ethyl chloroformate	Chloroformiate d'éthyle	Cloroformiato de etilo
542-76-7			3-Chloropropionitrile	3-Chloropropionitrile	3-Cloropropionitrilo
554-13-2		p	Lithium carbonate	Carbonate de lithium	Carbonato de litio
563-47-3		c,p	3-Chloro-2-methyl-1-propene	3-Chloro-2-méthylpropène	3-Cloro-2-metil-1-propeno
569-64-2	X		C.I. Basic Green 4	Indice de couleur Vert de base 4	Verde 4 básico
584-84-9	X	c	Toluene-2,4-diisocyanate	Toluène-2,4-diisocyanate	Toluen-2,4-diisocianato
606-20-2	X	c,p	2,6-Dinitrotoluene	2,6-Dinitrotoluène	2,6-Dinitrotolueno
612-83-9		c,p	3,3'-Dichlorobenzidine dihydrochloride	Dichlorhydrate de 3,3'-dichlorobenzidine	Dihidrocloruro de 3,3'-diclorobencidina
630-20-6			1,1,1,2-Tetrachloroethane	1,1,1,2-Tétrachloroéthane	1,1,1,2-Tetracloroetano
842-07-9	X	p	C.I. Solvent Yellow 14	Indice de couleur Jaune de solvant 14	Amarillo 14 solvente
872-50-4		p	N-Methyl-2-pyrrolidone	N-Méhyl-2-pyrrolidone	N-Metil2-pirrolidona
924-42-5		p	N-Methylolacrylamide	N-(Hydroxyméthyl)acrylamide	N-Metilolacrilamida
989-38-8	X		C.I. Basic Red 1	Indice de couleur Rouge de base 1	Rojo 1 básico
1163-19-5	X		Decabromodiphenyl oxide	Oxyde de décabromodiphényle	Óxido de decabromodifenilo
1313-27-5	X		Molybdenum trioxide	Trioxyde de molybdène	Trióxido de molibdeno
1314-20-1	X	p	Thorium dioxide	Dioxyde de thorium	Dióxido de torio
1332-21-4	X	c,p,t	Asbestos (friable form)	Amiante (forme friable)	Asbestos (friables)
1344-28-1	X		Aluminum oxide (fibrous forms)	Oxyde d'aluminium (formes fibreuses)	Óxido de aluminio (formas fibrosas)
1634-04-4	X		Methyl tert-butyl ether	Oxyde de tert-butyle et de méthyle	Éter metil terbutílico
1717-00-6			1,1-Dichloro-1-fluoroethane (HCFC-141b)	1,1-Dichloro-1-fluoroéthane (HCFC-141b)	1,1-Dicloro-1-fluoroetano (HCFC-141b)
2832-40-8	X		C.I. Disperse Yellow 3	Indice de couleur Jaune de dispersion 3	Amarillo 3 disperso
3118-97-6	X		C.I. Solvent Orange 7	Indice de couleur Orange de solvant 7	Naranja 7 solvente
4170-30-3			Crotonaldehyde	Crotonaldéhyde	Crotonaldehído
4680-78-8	X		C.I. Acid Green 3	Indice de couleur Vert acide 3	Verde 3 ácido
7429-90-5	X	m	Aluminum (fume or dust)	Aluminium (fumée ou poussière)	Aluminio (humo o polvo)
7550-45-0	X		Titanium tetrachloride	Tétrachlorure de titane	Tetracloruro de titanio
7632-00-0			Sodium nitrite	Nitrite de sodium	Nitrato de sodio
7637-07-2			Boron trifluoride	Trifluorure de bore	Trifluoruro de boro
7647-01-0	X		Hydrochloric acid	Acide chlorhydrique	Ácido clorhídrico
7664-39-3	X	t	Hydrogen fluoride	Fluorure d'hydrogène	Ácido fluorhídrico
7664-93-9	X		Sulfuric acid	Acide sulfurique	Ácido sulfúrico
7697-37-2	X		Nitric acid*	Acide nitrique	Ácido nítrico
7723-14-0	X		Phosphorus (yellow or white)	Phosphore (jaune ou blanc)	Fósforo (amarillo o blanco)
7726-95-6			Bromine	Brome	Bromo
7758-01-2		c,p	Potassium bromate	Bromate de potassium	Bromato de potasio
7782-41-4			Fluorine	Fluor	Fluor
7782-50-5	X		Chlorine	Chlore	Cloro
10049-04-4	X		Chlorine dioxide	Dioxyde de chlore	Dióxido de cloro

c = Known or suspected carcinogen.
m = Metal and its compounds
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.
* Nitric acid, nitrate ion and nitrate compounds are aggregated into one category called nitric acid and nitrate compounds in the matched data set.

Appendix B – Matched Chemicals—Listed in both TRI and NPRI, 2002 (*continued*)

CAS Number	In 1995–2002 Matched Data Set	Special Chemical Group	Chemical Name	Substance	Sustancia
13463-40-6			Iron pentacarbonyl	Fer-pentacarbonyle	Pentacarbonilo de hierro
25321-14-6	X	p	Dinitrotoluene (mixed isomers)	Dinitrotoluène (mélange d'isomères)	Dinitrotolueno (mezcla de isómeros)
26471-62-5	X	c,p	Toluenediisocyanate (mixed isomers)	Toluènediisocyanate (mélange d'isomères)	Toluendiisocianatos (mezcla de isómeros)
28407-37-6		p	C.I. Direct Blue 218	Indice de couleur Bleu direct 218	Índice de color Azul directo 218
--	X	m	Antimony and its compounds*	Antimoine (et ses composés)	Antimonio y compuestos
--			Chlorotetrafluoroethane (HCFC-124 and isomers)	Chlorotétrafluoroéthane	Clorotetrafluoroetano
--	X	m,c,p	Chromium and its compounds*	Chrome (et ses composés)	Cromo y compuestos
--	X	m,c,p	Cobalt and its compounds*	Cobalt (et ses composés)	Cobalto y compuestos
--	X	m	Copper and its compounds*	Cuivre (et ses composés)	Cobre y compuestos
--	X		Cresol (mixed isomers)**	Crésol (mélange d'isomères)	Cresol (mezcla de isómeros)
--	X		Cyanide compounds	Cyanure (et ses composés)	Cianuro y compuestos
--			Dichlorotrifluoroethane (HCFC-123 and isomers)	Dichlorotrifluoroéthane	Diclorotrifluoroetano
--		m,c,p,t	Lead and its compounds*	Plomb (et ses composés)	Plomo y compuestos
--	X	m	Manganese and its compounds*	Manganèse (et ses composés)	Manganeso y compuestos
--		m,p,t	Mercury and its compounds*	Mercure (et ses composés)	Mercurio y compuestos
--	X	m,c,p,t	Nickel and its compounds*	Nickel (et ses composés)	Níquel y compuestos
--	X		Nitric acid and nitrate compounds***	Acide nitrique et composés de nitrate	Ácido nítrico y compuestos nitrados
--		c,t	Polychlorinated alkanes (C10-C13)	Alcanes poychlorés (C10-C13)	Alcanos policlorinados (C10-C13)
--	X	m	Selenium and its compounds*	Sélénium (et ses composés)	Selenio y compuestos
--	X	m	Silver and its compounds*	Argent (et ses composés)	Plata y compuestos
--			Vanadium and its compounds*	Vanadium et ses composès	Vanadio y compuestos
--	X		Xylenes****	Xylènes	Xilenos
--	X	m	Zinc and its compounds*	Zinc (et ses composés)	Zinc y compuestos

c = Known or suspected carcinogen.
m = Metal and its compounds
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.
* Elemental compounds are reported separately from their respective element in TRI and aggregated with it in NPRI and in the matched data set.
** o-Cresol, m-cresol, p-cresol and cresol (mixed isomers) are aggregated into one category called cresols in the matched data set.
*** Nitric acid, nitrate ion and nitrate compounds are aggregated into one category called nitric acid and nitrate compounds in the matched data set.
**** o-Xylene, m-xylene, p-xylene and xylene (mixed isomers) are aggregated into one category called xylenes in the matched data set.

Appendix C – List of Facilities Appearing in *Taking Stock 2002*

Facility Name	City	State/ Province	PRTR ID Number	Tables and/or Section Facility Appears in							
349977 Ontario Limited, Lacombe Waste Services	Ottawa	ON	0000007310	10-23							
3M Canada Company (Perth)	Perth	ON	0000003201	9-11	9-13						
3V Inc.	Georgetown	SC	29440VCHMCPENNY	9-6							
Abbott Health Prods. Inc., Abbott Labs	Barceloneta	PR	00617BBTTCROADN	9-6							
Abitibi-Consolidated Company of Canada, Kenora	Kenora	ON	0000004030	6-12							
Acordis Cellulosic Fibres Inc., Acordis US Holding Inc.	Axis	AL	36505CRTLDUSHIG	7-5							
ADM Corn Processing, Archer Daniels Midland Co.	Cedar Rapids	IA	52404DMCRN1350W	6-12							
Ainsworth Lumber Co. Ltd., Grande Prairie OSB Mill	Grande Prairie	AB	0000004880	9-4							
AK Steel Butler Works (Route 8 S)	Butler	PA	16003RMCDVROUTE	6-5							
AK Steel Corp. (Rockport Works)	Rockport	IN	47635KSTLC6500N	4-5	5-5	6-5	7-5	Overview			
Alabama Power Company	Wilsonville	AL	NEI 7744	3-8							
Albemarle Corp.	Orangeburg	SC	29116THYLCCANNO	9-7	9-16						
Alcan Bauxite, Alumine et produits chimiques de spécialité, Usine Vaudreuil	Jonquière	QC	0000002978	10-25							
Alchem Aluminum Inc., Imco Recycling Inc.	Coldwater	MI	49036LCHML368WG	10-31							
Alcoa World Alumina L.L.C. Point Comfort Ops.	Point Comfort	TX	77978LMNMCSTATE	10-20							
Alfa-Fry Group (Cooksen Electronics)	Altoona	PA	--	10-11							
Allegheny Energy Supply Co/Hatfields Ferry Power Station	Masontown	PA	NEI 8227	3-8							
Altasteel Ltd., Stelco Inc.	Edmonton	AB	0000001106	10-33							
American Chrome & Chemicals L.P.	Corpus Christi	TX	78407MRCNC3800B	6-5							
American Drew Plant 13130130	North Wilkesboro	NC	28659MRCNDARMOR	10-31							
American Electric Power, Amos Plant	Winfield	WV	25213JHNMS1530W	4-5	5-5	Overview					
American Electric Power, Conesville Plant	Conesville	OH	43811MRCNL47201	10-20							
American Electric Power, Mitchell Plant	Moundsville	WV	26041MTCHLSTATE	5-5							
An Electric Power Muskingum River Plant, American Electric Power	Beverly	OH	45715MRCNLCOUNT	5-5							
Appalachian Power, John E Amos Plant	St. Albans	WV	NEI 11149	3-6							
Aqua Glass Main Plant, Masco Corp.	Adamsville	TN	38310QGLSSINDUS	9-6							
Aqua Glass Performance Plant, Masco Corp.	Mc Ewen	TN	37101QGLSS155FO	9-6							
Arco Alloys Corp.	Detroit	MI	48211RCLLY1891T	8-7							
ASARCO Inc., Amarillo Copper Refy., Americas Mining Corp.	Amarillo	TX	79120SRCNCHWY13	10-5							
ASARCO Inc., Ray Complex Hayden Smelter & Concentrator, Americas Mining Corp.	Hayden	AZ	85235SRCNC64ASA	4-5	5-5	6-5	7-5	9-3	Overview		
ASARCO Inc., Americas Mining Corp.	East Helena	MT	59635SRCNCSMELT	6-5	7-5	10-24					
Ashta Chemicals Inc.	Ashtabula	OH	44004LCPCH3509M	10-20							
AV Cell Inc., Tembec/Grasim Industries/Thai Rayon/P.T. Indo Barat	Atholville	NB	0000005008	9-5	9-14						
AWI/CDT	Fort Lauderdale	FL	33309WCDT 6788N	10-10							
BASF Corp.	Freeport	TX	77541BSFCR602CO	4-5	5-5	Overview					
Bayer Inc. Sarnia Site, Bayer AG	Sarnia	ON	0000001944	9-11	9-13						
Bethlehem Apparatus Company	Hellertown	PA	18055BTHLH890FR	Section 10.3							
Bethlehem Steel Corp., Burns Harbor Div.	Burns Harbor	IN	46304BTHLHBURNS	10-25	10-31						
Bethlehem Steel Corp., Sparrows Point Div.	Sparrows Point	MD	21219BTHLHDUALH	10-31							
BFI Canada Inc., BFI Calgary Landfill	Calgary	AB	0000005200	6-4							
BHP Copper N.A. San Manuel Ops.	San Manuel	AZ	85631MGMCPHIGHW	4-5	5-5	6-5	7-5	9-3	9-12	10-19	10-23
				Sections 7.2 and 10.3			Overview				
Big Cajun 2, NRG Energy Inc.	New Roads	LA	70760BGCJN9951C	10-24							
Bowater Maritimes Inc., Dalhousie Mill, Bowater Pulp and Paper Canada/OJI Paper	Dalhousie	NB	0000004876	6-4							
Bowater Produits forestiers du Canada Inc., Usine de Gatineau	Gatineau	QC	0000000929	10-25							
Bowater Produits forestiers du Canada, Papeterie Dolbeau	Dolbeau-Mistassini	QC	0000001979	6-12							

Appendix C – List of Facilities Appearing in *Taking Stock 2002* (*continued*)

Facility Name	City	State/ Province	PRTR ID Number	Tables and/or Section Facility Appears in
BP Chemicals, Green Lake Facility, BP America Inc.	Port Lavaca	TX	77979BPCHMTEXAS	5-5 9-3 9-12
BP Chemicals Inc., BP America Inc.	Lima	OH	45805BPCHMFORTA	5-5
Brandon Shores & Wagner Complex, Constellation Energy Group	Baltimore	MD	21226BRNDN1000B	5-5
Brass Craft Canada Ltd.	St. Thomas	ON	0000004463	8-4
Bredero Price, Shawcor Ltd.	Theodore	AL	36582BRDRS2879C	10-23
Bruce Mansfield, FirstEnergy Corp.	Shippingport	PA	15077FRSTNOFFRT	10-21 10-25
C & D Techs.	Attica	IN	47918CDCHR200WE	10-10
C & D Techs. Inc.	Conyers	GA	30207CDCHR1835I	10-10
C & D Techs. Inc.	Huguenot	NY	12746CDCHRROUTE	10-10
C & D Techs., Dynasty Div.	Milwaukee	WI	53212JHNSN900EK	10-10
Camoplast Inc, Division Roski I	Roxton Falls	QC	0000002561	9-4
Canadian Forest Products Ltd., Northwood Pulp Mill	Prince George	BC	0000001797	7-4 9-5 9-14
Canadian General-Tower Limited	Cambridge	ON	0000003475	9-11 9-13
Canadian Technical Tape, Montreal Plant	St-Laurent	QC	0000004399	9-11 9-13
Canfor - Prince George Pulp and Paper Mills, Canadian Forest Products Ltd.	Prince George	BC	0000004063	6-4 7-4 9-5 9-14
Cargill Corn Milling, Cargill Inc.	Eddyville	IA	52553CRGLLRR1CO	6-12
Cargill Foods, Cargill High River Plant, Cargill Inc.	High River	AB	0000005235	6-4 7-4
Cargill Inc.	Hammond	IN	46320MRCNM1100I	6-12
Cariboo Pulp and Paper Co., Daishowa Marubeni International Inc./Weldwood of Can	Quesnel	BC	0000000479	6-4 7-4
Carpenter Co.	Russellville	KY	42276RCRPNFORRE	Section 9.2
Carpenter Co. Tupelo Div.	Verona	MS	38879RCRPNLEEIN	Section 9.2
Caterpillar Inc. Mossville Complex	Mossville	IL	61552CTRPLOLDGA	10-21
Celanese Canada Inc., Weston Terminal	North York	ON	0000001165	Section 6.2
Celanese Canada Inc., Edmonton Facility	Edmonton	AB	0000001162	6-4 7-4
Celanese Ltd., Clear Lake Plant, Celanese Americas Corp.	Pasadena	TX	77507HCHST9502B	4-5 7-5
Cerro Metal Products	Bellefonte	PA	16823CRRMTBOX38	8-6
Chemical Waste Management Inc., Waste Management Inc.	Kettleman City	CA	93239CHMCL35251	5-5 9-3 9-12
Chemical Waste Management, Lake Charles Facility, Waste Management Inc.	Sulphur	LA	70665CHMCL7170J	10-37
Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington	OR	97812CHMCL17629	6-5
Chemical Waste Management, Waste Management Inc.	Emelle	AL	35459CHMCLHWY17	10-19
Chemrec Inc.	Cowansville	QC	0000002413	8-9
Chesterfield Power Station, Dominion Resources Inc.	Chester	VA	23836CHSTR500CO	10-24
Chevron Phillips Chemical Co., Chevron Corp.	Port Arthur	TX	77640CHVRN2001S	4-5
Choctaw Maid Farms, Carthage Plant	Carthage	MS	39051CHCTWHWY35	6-12
City of Hamilton, Swaru Incinerator	Hamilton	ON	0000005860	10-33
City of Vero Beach Municipal Utilities	Vero Beach	FL	32960CTYFV10017	6-12
Clean Harbors Buttonwillow L.L.C.	Buttonwillow	CA	93206SFTYK2500W	10-31
Clean Harbors Canada Inc., Lambton Facility	Corunna	ON	0000002537	5-5 6-4 8-8 9-2 9-11 10-4 10-9 10-19 10-23 10-24
Clean Harbors Canada Inc., London Service Center	London	ON	0000004949	6-4
Clean Harbors Canada, Inc. (Niagara)	Thorold	ON	0000005625	10-23 10-19
Clean Harbors Canada, Inc., Debert Central Transfer Facility	Debert	NS	0000005011	10-19 10-23
Clean Harbors Mercier, Inc.	Mercier	QC	0000005449	10-24
Clean Harbors of Braintree Inc., Clean Harbors Inc.	Braintree	MA	02184CLNHR385QU	10-23
Clean Harbors of Connecticut Inc., Clean Harbors Inc.	Bristol	CT	06010CLNHR51BRO	9-3 9-12 10-4
Clean Harbors Plaquemine L.L.C.	Plaquemine	LA	70764SFTYK32655	10-19 10-23 Section 10.3

Appendix C – List of Facilities Appearing in *Taking Stock 2002* (*continued*)

Facility Name	City	State/ Province	PRTR ID Number	Tables and/or Section Facility Appears in		
Clean Harbors Services Inc.	Chicago	IL	60617CLNHR11800	10-19	10-23	
Colfax Treating Co. L.L.C., Roy O. Martin Lumber Co. L.L.C.	Pineville	LA	71360DRWDTWADLE	10-31		
Cominco Ltd.	Trail	BC	--	10-11		
Compagnie Abitibi Consolidated du Canada, Division Belgo	Shawinigan	QC	0000002752	10-21	10-25	
Conagra Poultry Co. of Kentucky Inc., Conagra Foods Inc.	Hickory	KY	42051SBRDFUS45N	6-12		
Conagra Poultry Co., Conagra Foods	Natchitoches	LA	71457CNGRBHWY1B	6-12		
Conagra Poultry Co., Conagra Foods Inc.	Farmerville	LA	71241CNGRBHWY15	6-12		
Conesville Power Plant	Conesville	OH	NEI 7865	3-8		
Cooper Power Station, East Kentucky Power Co-Op Inc.	Burnside	KY	42519CPRPW1247S	10-6		
CP&L Roxboro Steam Electric Plant, Progress Energy	Semora	NC	27343RXBRS1700D	5-5		
Cytec Inds. Inc. Fortier Plant	Westwego	LA	70094MRCNC10800	7-5		
Daramic Inc., Intertech Group Inc.	Corydon	IN	47112VNTFB3430C	9-6		
Delphi Canada Inc., Oshawa Battery Plant	Oshawa	ON	0000003221	10-9	10-10	
Delphi Delco Electronics Sys. Milwaukee	Oak Creek	WI	53154DLCLC7929S	10-10		
Delphi Energy & Chassis Sys.	Anderson	IN	46018DLCRM2401C	10-10		
Delphi Energy & Chassis Sys., Indianapolis	Indianapolis	IN	46256NVRSL7601E	10-10		
Delphi Energy & Chassis Sys., Olathe, KS	Olathe	KS	66061DLCRM400WD	10-10		
Delphi Energy & Chassis Sys., Anaheim	Anaheim	CA	92801DLCRM1201N	10-10		
Delphi Energy & Chassis Sys., Fitzgerald	Fitzgerald	GA	31750DLCRMPERRY	10-10		
Delphi Energy & Chassis Sys., New Brunswick	New Brunswick	NJ	08903DLCRM760JE	10-10		
Delphi Packard Electric Sys.	Foley	AL	36535DLPHP17195	10-10		
Detroit Edison Monroe Power Plant, DTE Energy	Monroe	MI	48161DTRTD3500E	5-5		
Detroit Edison/Monroe Power	Monroe	MI	NEI 7176	3-6		
Dlubak Glass Co.	Upper Sandusky	OH	--	10-11		
DNN Galvanizing	Windsor	ON	0000000276	8-4		
Doe Run Co. Glover Smelter, Renco Group Inc.	Glover	MO	63646SRCNCHIGHW	10-5		
Doe Run Co. Herculaneum Smelter, Renco Group Inc.	Herculaneum	MO	63048HRCLN881MA	4-5	5-5	10-5
Doe Run Co. Recycling Facility, Renco Group Inc.	Boss	MO	65440BCKSMHIGHW	10-4	10-5	10-11
Dofasco Inc., Dofasco Hamilton	Hamilton	ON	0000003713	6-4	8-4	9-2
Domfoam International Inc., Domfoam, Valle Foam Industries (1995) Inc	St Leonard	QC	0000002601	9-4		
Dominion Castings Ltd., ABC NACO Inc.	Hamilton	ON	0000004739	7-4		
Douglas Battery Mfg. Co.	Winston-Salem	NC	27107DGLSB500BA	10-10		
Dow Chemical Canada Incorporated, Western Canada Operations	Fort Saskatchewan	AB	0000000280	10-33		
Dow Chemical Co. Freeport Facility	Freeport	TX	77541THDWCBUILD	10-31		
Dow Chemical Co. Midland Ops.	Midland	MI	48667THDWCMICHI	10-31		
Dow Corning Corp.	Carrollton	KY	41008DWCRNUSHIG	8-5		
Dow Corning Corp.	Midland	MI	48686DWCRN3901S	8-5		
DP&L, J.M. Stuart Generating Station	Aberdeen	OH	NEI 7870	3-6	3-8	
DTR Tennessee Inc.	Midway	TN	37809DTRTN199BO	6-12		
DuPont Beaumont Plant	Beaumont	TX	77704DPNTBSTATE	5-5		
DuPont Delisle Plant	Pass Christian	MS	39571DPNTD7685K	5-5	10-31	10-37
DuPont Edgemoor	Edgemoor	DE	19809DPNTD104HA	10-31	10-37	
DuPont Johnsonville Plant	New Johnsonville	TN	37134DPNTJ1DUPO	5-5	10-31	10-37
DuPont Victoria Plant	Victoria	TX	77902DPNTVOLDBL	5-5	6-5	7-5
Duke Energy, Belews Creek Steam Station	Belews Creek	NC	27052DKNRGPINEH	5-5		

Appendix C – List of Facilities Appearing in *Taking Stock 2002* (*continued*)

Facility Name	City	State/ Province	PRTR ID Number	Tables and/or Section Facility Appears in			
Duke Energy Corp., Belews Creek Steam Station	Walnut Cove	NC	NEI 46101	3-6			
Duke Energy, Marshall Steam Station	Terrell	NC	28682DKNRG8320E	5-5			
Dunkirk Steam Station, NRG Energy Inc.	Dunkirk	NY	14048NGRMH106PO	9-7	9-16	10-6	
Eastman Chemical Co., Tennessee Ops.	Kingsport	TN	37662TNNSSEASTM	9-7	9-16		
Eastman Chemical Co., Voridian Div.	Cayce-West Columbia	SC	29202CRLNSUSHIG	9-16			
Eastman Kodak Co., Kodak Park	Rochester	NY	14652STMNK1669L	9-6			
Edison Mohave Generating Station, Edison Intl. Corp.	Laughlin	NV	89029MHVGN2600E	10-5			
Electrolux Home Prods.	Webster City	IA	50595WHTCN600ST	9-7	9-16		
Emballages Smurfit-Stone Canada Inc., Usine de La Tuque, Smurfit-Stone Container	La Tuque	QC	0000003140	7-4			
Enersys Inc.	Hays	KS	67601YSXDBONEEX	10-10			
Enersys Inc. Battery Plant	Richmond	KY	40475XDCRP876RI	10-10			
Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon	OH	43616NVRSF8760T	4-5	5-5	6-5	
Epcor Generation Inc., Genesee Thermal Generating Station	Warburg	AB	0000000267	10-40			
EQ Resource Recovery Inc., EQ Holding Co.	Romulus	MI	48174MCHGN36345	4-5			
Equistar Chemicals L.P., Victoria Facility	Victoria	TX	77902CCDNTOLDBL	4-5			
Essroc Cement Corp.	Logansport	IN	46947CPLYCSTATE	10-20	10-24		
Eurocan Pulp and Paper Company, West Fraser Mills	Kitimat	BC	0000003171	6-4	7-4		
Exide Corp.	Fort Smith	AR	72901GNBNC4115S	8-5	10-10		
Exide Corp.	Frisco	TX	--	10-11			
Exide Corp.	Muncie	IN	--	10-11			
Exide Corp.	Salina	KS	67401XDBTT413EB	10-9	10-10		
Exide Corp., Reading SLI	Laureldale	PA	19605XDCRP3000M	10-10			
Exide Corp., Reading Smelter Div.	Reading	PA	--	10-11			
Exide Corporation, Canon Hollow Plant	Forest City	MO	--	10-11			
Exide Corporation, Schulkill Metals Division	Baton Rouge	LA	--	10-11			
Exide Techs.	Bristol	TN	37620XDCRP364EX	4-5	10-9	10-10	Section 10.2
Exide Techs.	City of Industry	CA	91746GNBNC14500	10-10			
Exide Techs.	Florence	MS	39073GNBNC250EL	10-10			
Exide Techs.	Kansas City	KS	66115GNBNC3001F	10-10			
Exide Techs.	Manchester	IA	52057XDCRPSOUTH	10-9	10-10		
Exide Techs.	Shreveport	LA	71129GNBNC6901W	10-10			
Exide Techs. dba GNB Indl. Power	Kankakee	IL	60901GNBNC2500W	8-5	10-10		
Extruded Metals Inc.	Belding	MI	48809XTRDD302AS	8-7			
Falconbridge Ltd-Kidd Metallurgical Div., Kidd Metallurgical Site	Timmins/District of Cochrane	ON	0000002815	4-5	8-8	10-5	10-9
Farmer Bros Co.	Torrance	CA	90509FRMRB20333	9-7			
Firestone Polymers, Bridgestone/Firestone Diversified Prods. L.L.C.	Sulphur	LA	70602FRSTNLA108	4-5			
Foamex L.P.	Corry	PA	16407FMXPR466SH	9-6			
Fonderie Générale du Canada, Noranda Inc.	Lachine	QC	0000000188	8-9	10-9	10-11	
Formosa Plastics Corp. Louisiana	Baton Rouge	LA	70805FRMSPGULFS	10-31			
Four Corners Power Plant	Fruitland	NM	NEI 7668	3-6			
Gage Products	Ferndale	MI	48220GGPRD625WA	8-7			
Galey & Lord Society Hill	Society Hill	SC	29593BRLNGHWY15	9-16			
Gavin Power Plant	Cheshire	OH	NEI 13165	3-6			
GB Biosciences Corp.	Houston	TX	77015FRMNT2239H	10-37			
GE Co. Silicone Prods.	Waterford	NY	12188GNRLL260HU	8-5			

Appendix C – List of Facilities Appearing in *Taking Stock 2002* (*continued*)

Facility Name	City	State/ Province	PRTR ID Number	Tables and/or Section Facility Appears in				
General Motors of Canada Limited, Oshawa Car Assembly Plant	Oshawa	ON	0000003893	9-11	9-13			
Georgia Power, Bowen Steam Electric Generating Plant, Southern Co.	Cartersville	GA	30120BWNST317CO	4-5	5-5	Overview		
Georgia Power Company, Bowen Steam-Electric Generating Plant	Cartersville	GA	NEI 12824	3-6	3-8			
Georgia Power Scherer Steam Electric Generating Plant	Juliette	GA	31046SCHRR10986	4-5	5-5			
Georgia-Pacific Corp. Paper Mill	Palatka	FL	32078GRGPCSTATE	9-7	9-16			
Gerdau AmeriSteel, MRM Special Sections	R.M of St. Andrews	MB	0000001651	10-33				
Gerdau AmeriSteel, Whitby	Whitby	ON	0000003824	6-4	7-4	8-4		
Gibson Generating Station, Cinergy Corp.	Princeton	IN	47670PSNRGHWY64	5-5				
GM Powertrain Defiance, General Motors Corp.	Defiance	OH	43512GMC STATE	7-5				
Gopher Resource Corp	Eagan	MN	--	10-11				
Grand Falls-Windsor, Exploits Regional Services Board, Solid Waste Disposal Site	Grand Falls-Windsor	NL	0000005034	10-33				
Grede Foundries Inc.	Reedsburg	WI	53959GRDFN700AS	6-12				
Gulf Coast Recycling Inc.	Tampa	FL	--	10-11				
Gulf Power Co., Plant Crist, Southern Co.	Pensacola	FL	32514GLFPW11999	5-5				
Harbour Grace, Conception Bay North Incinerator Association	Harbour Grace	NL	0000005036	10-33				
Hawker Energy Prods. Inc.	Warrensburg	MO	64093GTSNR617NO	10-10				
Horsehead Development Co.	Chicago	IL	--	10-11				
Horsehead Resource Development	Palmerton	PA	18071HRSHDDELAW	8-6	10-11			
Howe Sound Pulp and Paper LP, Canadian Forest Products/Oji Paper Canada	Port Mellon	BC	0000001419	10-33				
Hudson Bay Mining and Smelting Company Ltd., Metallurgical Complex, Anglo American PLC	Flin Flon	MB	0000003414	3-8	10-5	10-19	10-20	10-24
Huntley Generating Station, NRG Energy Inc.	Tonawanda	NY	14150CRHNT3500R	9-7	9-16	10-6		
Imco Recycling Inc.	Morgantown	KY	42261MCRCY609GA	10-31				
Imco Recycling of Michigan L.L.C.	Coldwater	MI	49036MCRCY267NO	8-7	10-31			
Imco Recycling of Ohio Inc.	Uhrichsville	OH	44683MCRCY7335N	10-31				
Imperial Oil, Sarnia Refinery Plant	Sarnia	ON	0000003704	7-4				
Impex Trading Services	Calgary	AB	--	Section 8.3				
Inco Limited, Copper Cliff Smelter Complex	Copper Cliff	ON	0000000444	3-8	9-4	10-5		
Inco Limited, Thompson Operations	Thompson	MB	0000001473	3-8	9-2	9-4	9-5	9-14
International Metals Reclamation Co. Inc. (Inmetco), Inco US Inc.	Ellwood City	PA	16117NTRNTSR488	10-24				
Intertape Polymer Group Columbia Div., Cetral Prods. Co.	Columbia	SC	29205NCHRC2000S	9-15				
IPSCO Saskatchewan Inc., Regina Plant Site, IPSCO Inc.	Regina	SK	0000002740	7-4	9-2	9-11	10-4	10-33
Irving Pulp & Paper Limited / Irving Tissue Company, J.D. Irving Limited	Saint John	NB	0000002604	7-4	9-5	9-14		
ISPAT Inland Inc., ISPAT Intl. N.V.	East Chicago	IN	46312NLNDS3210W	6-5				
Ispat Sidbec Inc., Aciérie, Ispat International Ltd.	Contrecœur	QC	0000003649	7-4	10-4			
Ispat Sidbec Inc., Sidbec-Feruni (Ispat) Inc. Contrecœur, Ispat International	Contrecœur	QC	0000003655	10-4				
ITW Foils - Windsor, Illinois Tool Works	Windsor	ON	0000005627	9-13				
Ivaco Rolling Mills Limited Partnership	L'Orignal	ON	0000001520	6-4	8-4			
J & L Specialty Steel L.L.C.	Louisville	OH	44641JLSPC1500W	4-5				
J.M. Stuart Station, Dayton Power & Light Co.	Manchester	OH	45144DYTNP745US	5-5				
Jayhawk Fine Chemicals Corp.	Galena	KS	66739LLCCH22MIS	4-5	Section 6.2			
Johnson Control Battery Group Inc. Geneva	Geneva	IL	60134JHNSN300SO	10-10				
Johnson Controls Battery Group	Fullerton	CA	92634JHNSN1550E	10-10				
Johnson Controls Battery Group Inc.	Canby	OR	97013JHNSN800NW	10-10				
Johnson Controls Battery Group Inc.	Florence	KY	41042JHNSN8040B	10-10				
Johnson Controls Battery Group Inc.	Kernersville	NC	27102JHNSN2701W	10-10				

Appendix C – List of Facilities Appearing in *Taking Stock 2002* (*continued*)

Facility Name	City	State/ Province	PRTR ID Number	Tables and/or Section Facility Appears in						
Johnson Controls Battery Group Inc.	Middletown	DE	19709JHNSNRD170	10-10						
Johnson Controls Battery Group Inc.	Milwaukee	WI	53209JHNSN5400N	10-10						
Johnson Controls Battery Group Inc.	Saint Joseph	MO	64502JHNSN4722P	10-10						
Johnson Controls Battery Group Inc.	Tampa	FL	33612JHNSN10215	10-10						
Johnson Controls Distribution Center	Saint Joseph	MO	64504JHNSN2330L	10-10						
Johnson Controls Fort Wayne Distribution Center	Fort Wayne	IN	46899NVRSL8710I	4-5	10-9	10-10				
Johnson Controls Inc. Battery Group	Holland	OH	43528JHNSN10300	10-10						
Joliet Generating Station (#9 & #29), Edison Intl.	Joliet	IL	60436JLTGN1800C	10-6						
K.C. Recycling Ltd.	Trail	BC	0000007830	4-5	10-9	Section 10.2				
Kansas City Power & Light Co.	Lacygne	KS	NEI 6691	3-6						
Karmax Heavy Stamping, Cosma International Inc.	Milton	ON	0000003949	4-5						
Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna	UT	84006KNNCT8362W	4-5	5-5	7-5	9-3	9-12	10-4	Overview
Kennedy Valve, McWane Inc.	Elmira	NY	14901KNNDY1021E	10-6						
Kerr-McGee Chemical L.L.C. Pigment Plant	Hamilton	MS	39746KRRMCUSHWY	10-21						
Kerr-McGee Pigments (Savannah) Inc., Kerr-McGee Corp.	Savannah	GA	31404KMRNCEASTP	10-31						
L&M Precision Products Inc.	Toronto	ON	0000005924	8-4						
La Compagnie Abitibi Consolidated du Canada, Division Port-Alfred	La Baie	QC	0000002636	9-5	9-14					
Lansing Board of Water & Light- Eckert	Lansing	MI	48901LNSNG601IS	10-25						
Lasco Bathware Inc., Tomkins Corp.	Cordele	GA	31015PHLPS210SO	9-6						
Lasco Bathware Inc., Tomkins Corp.	Three Rivers	MI	49093PHLPS15935	9-6						
Lehigh Southwest Cement Co.	Tehachapi	CA	93561CLVRS13573	10-20						
Lenzing Fibers Corp.	Lowland	TN	37778LNZNGTENNE	4-5	5-5	9-12	9-15	Overview		
Limestone Electric Generating Station, Texas Genco L.P.	Jewett	TX	75846LMSTNFM39A	10-20						
MAAX Canada Inc. Westco Div., MAAX Inc.	Armstrong	BC	0000005123	9-4						
Marisol Inc.	Middlesex	NJ	08846MRSLN125FA	4-5						
Metal Chem	Pittsburgh	PA	01158	8-6						
Métallurgie Magnola Inc., Noranda Inc./Société générale de financement du Québec	Danville	QC	0000005520	10-33	10-40					
Methanex Corporation, Medicine Hat Plant	Medicine Hat	AB	0000001782	7-4						
Monsanto - Luling	Luling	LA	70070MNSNTRIVER	9-3	9-12					
Mount Storm Power Plant	Mount Storm	WV	NEI 11168	3-6						
Mount Storm Power Station, Dominion Resources Inc.	Mount Storm	WV	26739MTSTRHC76B	10-24						
Mueller Brass Co.	Port Huron	MI	48060MLLRB1925L	8-7						
Muskingum River Power Plant	Waterford	OH	NEI 7882	3-8						
National Plastics Color Inc.	Valley Center	KS	67147NTNLP2600W	9-3	9-12	10-4				
National Steel Corp. Greatlakes Ops.	Ecorse	MI	48229GRTLKNO1QU	4-5	5-5	6-5	7-5	Overview		
New Madrid Power Plant	New Madrid County	MO	NEI 7526	3-6						
Nexen Chemicals Canada Limited Partnership, Nexen Inc.	Nanaimo	BC	0000003526	7-4						
Nexen Chemicals Canada Limited Partnership, Squamish	Squamish	BC	0000005394	10-19	10-23	10-25				
Nexfor Fraser Papers Inc., Edmundston Operations	Edmundston	NB	0000001221	9-5	9-14					
Norampac Inc., Red Rock Division	Red Rock	ON	0000003013	10-25						
Noranda Inc, Brunswick Smelter	Belledune	NB	0000004024	9-2	9-11	10-4	10-11	10-40		
Noranda Inc, Fonderie Horne	Rouyn-Noranda	QC	0000003623	8-9	10-5	10-24				
Noranda Inc., Fonderie Gaspé	Murdochville	QC	0000003385	10-5	10-25					
Norske Skog Canada Limited (NorskeCanada), Powell River Division	Powell River	BC	0000000723	10-33						
Norske Skog Canada Limited, Crofton Division	Crofton	BC	0000001266	6-4	7-4	10-33				

Appendix C – List of Facilities Appearing in *Taking Stock 2002* (*continued*)

Facility Name	City	State/ Province	PRTR ID Number	Tables and/or Section Facility Appears in				
Norske Skog Canada Limited, Port Alberni Division	Port Alberni	BC	0000001593	10-33				
NorskeCanada, Elk Falls Division	Campbell River	BC	0000000333	10-33				
North Star BHP Steel L.L.C., NSS Ventures Inc.	Delta	OH	43515NRTHS6767C	4-5				
Northern States Power Co.	Becker	MN	55308NRTHR13999	10-31				
Northwestern Steel & Wire Co.	Sterling	IL	61081NRTHW121WA	6-5	7-5			
NOVA Chemicals Corporation, St. Clair River Site	Corunna	ON	0000004700	7-4				
Nova Pb Incorporated	Ville Ste-Catherine	QC	0000004402	8-9	10-11			
Nova Scotia Power Incorporated, Lingan Generating Station	Lingan	NS	0000003992	10-24				
Nucor Steel Arkansas, Nucor Corp.	Blytheville	AR	72315NCRST7301E	4-5				
Nucor Steel Hertford County, Nucor Steel	Cofield	NC	27922NCRST1505R	10-24				
Nucor Steel Nebraska, Nucor Corp.	Norfolk	NE	68701NCRSTRURAL	5-5	7-5			
Nucor Steel, Nucor Corp.	Crawfordsville	IN	47933NCRST400SO	4-5	5-5	6-5	7-5	Overview
Nucor Steel, Nucor Corp.	Huger	SC	29450NCRST1455H	4-5	5-5	6-5	7-5	Overview
Nucor-Yamato Steel Co., Nucor Corp.	Blytheville	AR	72316NCRYM5929E	4-5				
Olin Corp. - Zone 17 Facility	East Alton	IL	62024LNCRPLEWIS	4-5				
Ontario Power Generation Inc, Nanticoke Generating Station	Nanticoke	ON	0000001861	3-6	5-5	6-4	Overview	
Onyx Environmental Services L.L.C.	Port Arthur	TX	77643WSTMNHWY73	10-23				
Onyx Environmental Services L.L.C.	West Carrollton	OH	45449CWMRS4301I	4-5				
Optima Batteries Inc.	Aurora	CO	80011PTMBT17500	10-10				
Ormet Aluminum Mill Prods. Corp.	Friendly	WV	26135BNSRNSTATE	10-31				
Osram Sylvania Ltée	Drummondville	QC	0000001816	10-24				
Owensboro Municipal Utilities, Elmer Smith Station	Owensboro	KY	42303LMRSM4301U	10-21				
Oxy Vinyls L.P. La Porte VCM Plant, Occidental Petroleum Corp.	La Porte	TX	77571LPRTC2400M	10-31				
PCS Nitrogen Fertilizer L.P.	Geismar	LA	70734RCDNCHIGHW	10-6				
Peoria Disposal Co. 1, Coulter Cos. Inc.	Peoria	IL	61615PRDSP4349W	4-5	5-5	Overview		
Petro-Chem Processing Group/Solvent Distillers Group, Philip Services Corp.	Detroit	MI	48214PTRCH421LY	4-5	8-5			
Pfizer Inc., Parke-Davis Div.	Holland	MI	49424PRKDV188HO	4-5				
Pharmacia & Upjohn Co., Pfizer Inc.	Kalamazoo	MI	49001THPJH7171P	4-5				
Phelps Dodge Hidalgo Inc., Phelps Dodge Corp.	Playas	NM	88009PHLPSHIDAL	6-5	7-5			
Philip Enterprises Inc., Fort Erie Facility	Fort Erie	ON	0000005646	8-4				
Philip Services Corp., 52 Imperial St.	Hamilton	ON	0000001928	6-4				
Philip Services Inc.	Hamilton	ON	01729	8-8				
Philip Services Inc., Parkdale Avenue Facility	Hamilton	ON	0000005645	6-4				
Philip Services Inc., Rexdale Facility	Etobicoke	ON	0000005648	6-4	10-23			
Pilgrim's Pride Corp. Mt. Pleasant Complex	Mount Pleasant	TX	75455PLGR11000S	6-12				
Polybrite, Decoma International Inc.	Richmond Hill	ON	0000003927	6-12				
Pope & Talbot Ltd., Harmac Pulp Operations	Nanaimo	BC	0000001383	10-33				
Potlatch Corp., Idaho Pulp & Paperboard	Lewiston	ID	83501PTLTC805MI	9-7	9-16			
PPG Inds. Inc.	New Martinsville	WV	26155PPGNDSTATE	10-20	10-21	10-25		
PPL Montour LLC/Montour	Washingtonville	PA	NEI 8191	3-8				
Prepa San Juan Steam Plant, Puerto Rico Electric Power Authority	Puerto Nuevo	PR	00920PRPSNMERCA	10-21	10-25			
Progress Energy Crystal River Energy Complex	Crystal River	FL	34428FLRDP15760	5-5				
PSI Energy - Gibson	Princeton	IN	NEI 31699	3-6	3-8			
Quebecor World Franklin	Franklin	KY	42134BRWNPBRODE	9-15				
Quebecor World Inc., Quebecor World Islington	Etobicoke	ON	0000003447	8-4	9-13			

Appendix C – List of Facilities Appearing in *Taking Stock 2002* (*continued*)

Facility Name	City	State/ Province	PRTR ID Number	Tables and/or Section Facility Appears in						
Quebecor World Memphis Corp.-Dickson Facility	Dickson	TN	37055MXWLLOLDCO	9-15						
Quebecor World Richmond Inc.	Richmond	VA	23228MXWLL7400I	9-15						
Quemetco Inc	City of Industry	CA	--	10-11						
Quemetco Inc.	Indianapolis	IN	--	10-11						
QW Memphis Corp., Quebecor World Inc.	Memphis	TN	38116MXWLL828EA	9-15						
Reliant Energy, Keystone Power Plant	Shelocta	PA	NEI 8179	3-8						
Reliant Energy, Keystone Power Plant	Shelocta	PA	15774KYSTNRTE21	4-5	5-5	6-5	10-20	Overview		
Reliant Energy/Keystone Power Plt	Shelocta	PA	NEI PA17368	3-8						
Republic Engineered Prods. L.L.C., Lorain Plant	Lorain	OH	44055SSLRN1807E	10-6						
Revere Smelting & Refining Corp., Eco-Bat New York L.L.C.	Middletown	NY	10940RVRSMRD2BA	4-5	10-9	10-11	Section 10.2			
Rineco	Benton	AR	72015RNC001007V	4-5						
Roquette America Inc., Keokuk Plant	Keokuk	IA	52632THHBNONEPR	6-12						
Rouge Steel Co., Rouge Inds. Inc.	Dearborn	MI	48121RGSTL3001M	4-5	5-5	Overview				
Safety-Kleen Canada Inc., Centre de Recyclage de St-Constant	St-Constant	QC	0000005421	8-4						
Safety-Kleen Sys. Inc.	Smithfield	KY	40068SFTYK3700L	4-5						
Saint-Gobain Ceramic Materials Canada Inc, Chippawa	Niagara Falls	ON	0000005677	6-12						
Sam Adelstein & Co. Limited	St. Catharines	ON	01819	8-8						
Sanders Lead Co. Inc.	Troy	AL	36081SNDRSHENDE	5-5	9-3	9-12	10-4	10-11		
Sandvik Materials Technology, Tube Production Unit	Arnprior	ON	0000004524	9-2	9-4					
SaskPower, Boundary Dam Power Station	Estevan	SK	0000002081	10-24						
Scana Urquhart Station	Beech Island	SC	29841RQHRT100UR	10-21	10-25					
Services environnementaux Clean Harbors Québec, Inc, Centre de transfert de Thurso	Thurso	QC	0000005455	10-23						
Sheerness Generating Station, ATCO Power/TransAlta Utilities Corporation	Hanna	AB	0000001036	10-40						
Sherritt International Corporation, Fort Saskatchewan	Fort Saskatchewan	AB	0000002132	7-4						
Shurtape Techs. Inc. Hickory Tape Plant, STM Inc.	Hickory	NC	28601SHFRDLIGHL	9-15						
Slater Stainless Corp., Aciers Inoxydables Atlas, Slater Steel Inc.	Sorel-Tracy	QC	0000003953	9-2						
Slocan Group, Tackama Division, Slocan Forest Products	Ft. Nelson	BC	0000005178	10-40						
Société en commandite Revenu Noranda	Valleyfield	QC	0000002938	10-23						
Solutia - Chocolate Bayou	Alvin	TX	77511SLTNCFM291	4-5	5-5	6-5	7-5	9-3	9-12	Sections 9.2 and 9.3
Solutia Inc.	Cantonment	FL	32533MNSNT3000O	4-5	5-5	Overview				
Solutia Inc.	Decatur	AL	35601MNSNTCOURT	10-31						
Solutia Port Plastics	Addyston	OH	45001MNSNTRIVER	9-7						
Sorrento Lactalis Inc., Lactalis American Group Inc.	Nampa	ID	83653SMPLT4912E	6-12						
Southeastern Chemical & Solvent Co. Inc., M&M Chemical & Equipment Co.	Sumter	SC	29151STHST755IN	4-5						
Stablex Canada, Inc.	Blainville	QC	0000005491	8-9						
Steel Dynamics Inc.	Butler	IN	46721STLDY4500C	4-5	5-5	6-5	7-5	Overview		
Stelco Inc., Stelco Hamilton	Hamilton	ON	0000002984	9-2	9-4	9-11	9-13			
Sterling Chemicals Inc.	Texas City	TX	77592STRLN201BA	7-5						
Stora Enso, Stora Enso Port Hawkesbury Limited	Port Hawkesbury	NS	0000002221	6-4	7-4					
Sunpine Forest Products, Treating Plant, Weldwood of Canada	Sundre	AB	0000004827	6-12						
Tampa Electric Co. Gannon Station, TECO Energy Inc.	Tampa	FL	33619TMPLC3602P	5-5						
Teck Cominco Metals Ltd., Trail Operations	Trail	BC	0000003802	6-4	10-6	10-21	10-25	Section 10.3		
Teepak L.L.C.	Danville	IL	61832TPKNC915NM	9-15						
Tembec Inc, Site de Témiscaming	Témiscaming	QC	0000002948	6-12	9-5	9-14				
Tenneco Automotive, Walker Cambridge	Cambridge	ON	0000005672	4-5						

Appendix C – List of Facilities Appearing in *Taking Stock 2002* (*continued*)

Facility Name	City	State/ Province	PRTR ID Number	Tables and/or Section Facility Appears in			
Thalheimer	Philadelphia	PA	--	8-6			
Tolko Manitoba Kraft Papers, Tolko Industries Ltd.	The Pas	MB	0000002051	7-4			
Tonolli Canada Ltd.	Mississauga	ON	--	10-11			
Town of Channel - Port aux Basques, Incinerator	Port Aux Basques	NL	0000005028	10-33			
Town of Clarenville, Incinerator	Clarenville	NL	0000005029	10-33			
Town of Deer Lake, Incinerator	Deer Lake	NL	0000005031	10-33			
Town of Holyrood, Incinerator	Holyrood	NL	0000005037	10-33			
Town of Marystown, Waste Disposal Site Jean de Baie	Marystown	NL	0000005040	10-33			
Town of Stephenville, Incinerator	Stephenville	NL	0000005051	10-33			
Town of Wabush, Incinerator	Wabush	NL	0000005054	10-33			
Traer Mfg. Inc.	Traer	IA	50675TRRMNHIGHW	8-5			
TransAlta Corporation, Wabamun Thermal Generating Plant	Wabamun	AB	0000002282	10-24			
Triple M Metal	Brampton	ON	0000007605	8-8			
Trojan Battery Co.	Lithonia	GA	30058TRJNB5194M	10-10			
Trojan Battery Co.	Santa Fe Springs	CA	90670TRJNB12380	10-10			
Trojan Battery Co.	Santa Fe Springs	CA	90670TRJNB9440A	10-10			
TVA	Drakesboro	KY	NEI 6833	3-6			
TVA Cumberland Fossil Plant	Cumberland	TN	NEI 8350	3-6			
TVA Johnsonville Fossil Plant	New Johnsonville	TN	NEI 8375	3-8			
TXU Monticello Steam Electric Station & Lignite Mine	Mount Pleasant	TX	75455MNTCLOFFFM	10-20			
Tyson Foods Inc.	Center	TX	75935HLLYF1019S	6-12			
US Battery Mfg. Co.	Augusta	GA	30906SBTTR1895T	10-10			
US Battery Mfg. Co.	Corona	CA	91719SBTTR1675S	10-10			
US Battery Mfg. Co.	Evans	GA	30809SBTTR653IN	10-10			
US Ecology Idaho Inc., American Ecology Corp.	Grand View	ID	83624NVRSF1012M	4-5	5-5	Overview	
USS Gary Works, US Steel Corp.	Gary	IN	46402SSGRYONENO	5-5	10-6	10-21	10-31
US Magnesium L.L.C., Renco Group Inc.	Rowley	UT	84074MXMGNROWLE	5-5	6-5	7-5	10-31
US TVA Johnsonville Fossil Plant	New Johnsonville	TN	37134STVJH535ST	4-5	5-5	6-5	Overview
US TVA Paradise Fossil Plant, US Tennessee Valley Authority	Drakesboro	KY	42337STVPR13246	10-25			
US TVA Shawnee Fossil Plant, US Tennessee Valley Authority	West Paducah	KY	42086STVSH7900M	10-25			
Union Carbide Corp.Taft/Star Mfg. Plant, Dow Chemical Co.	Hahnville	LA	70057NNCRBHWY31	9-7	9-16		
Union Electric Steel Corp., Ampco-Pittsburgh Corp.	Burgettstown	PA	15021NNLCTPOBOX	6-12			
Valley Power Plant, Wisconsin Energy Corp.	Milwaukee	WI	53233VLLYP1035W	10-6			
Vickery Environmental Inc., Waste Management of Ohio	Vickery	OH	43464WSTMN3956S	4-5	5-5		
Ville de Québec, Incinérateur	Québec	QC	0000000211	10-33			
Viskase Corp.	Loudon	TN	37774VSKSCEASTL	9-15			
Viskase Corp.	Osceola	AR	72370VSKSCRT198	9-15			
Vitafoam Products Canada Ltd., Toronto	Downsview	ON	0000004552	9-2	9-4	9-11	9-13
Vonroll America Inc. WTI Final, Heritage-WTI L.L.C.	East Liverpool	OH	43920VNRLL1250S	6-12			
W.H. Sammis Plant	Stratton	OH	NEI 7877	3-6	3-8		
W.H. Sammis Plant, FirstEnergy Corp.	Stratton	OH	43961FRSTNSTATE	5-5			
Wabash Alloys L.L.C., Connell L.P.	Wabash	IN	46992WBSHLOLDUS	10-31			
Wabash Alloys, Wabash Alloys Guelph	Guelph	ON	0000001067	10-33			
Wabash Alloys, Wabash Alloys Mississauga	Mississauga	ON	0000005732	10-33			
Waltec Forgings Inc., Wallaceburg Forge Plant	Wallaceburg	ON	0000004432	8-4			

Appendix C – List of Facilities Appearing in *Taking Stock 2002* (*continued*)

Facility Name	City	State/ Province	PRTR ID Number	Tables and/or Section Facility Appears in				
Wayne Farms L.L.C. Danville, Contigroup Cos.	Danville	AR	72833CNTNN615MA	6-12				
Wayne Farms L.L.C. Dobson, Contigroup Cos.	Dobson	NC	27017WYNFR1018E	6-12				
Western Pulp Limited Partnership, Doman Industries	Squamish	BC	0000002872	6-12	10-33			
Western Pulp Limited Partnership, Port Alice Cellulose Operation	Port Alice	BC	0000002377	10-25				
Westlake Vinyls Inc., Westlake Chemical Corp.	Calvert City	KY	42029WSTLK2468I	10-19	10-23	10-24	10-31	
Weyerhaeuser Co.	Longview	WA	98632WYRHS3401I	9-6				
Weyerhaeuser Co. Pulp Paper & Packaging Facility	Plymouth	NC	27962WYRHSTROWB	10-31				
Weyerhaeuser Company Limited, Kamloops Pulp Division	Kamloops	BC	0000002924	9-5	9-14			
Weyerhaeuser Company Limited, Miramichi OSB	Miramichi	NB	0000005003	9-2	9-4	9-13		
Weyerhaeuser Saskatchewan Limited, Prince Albert Pulp & Paper	Prince Albert	SK	0000003610	9-5	9-14			
Wheatland Tube Co., Sharon Plant, John Maneely Co.	Sharon	PA	16146SWHLL200CL	8-5				
Wheatland Tube Co., Wheatland Plant, John Maneely Co.	Wheatland	PA	16161WHTLNCOUNC	8-5				
World Resources Co.	Tolleson	AZ	85043WRLDR8113W	8-5				
Zalev Brothers Co., Ferrous Processing & Trading Co.	Windsor	ON	0000004980	6-4				
Zinc Corp. of America, Monaca Smelter, Horsehead Inds.	Monaca	PA	15061ZNCCR300FR	8-6	4-5	5-5	10-23	Overview
Zinc Nacional S.A	Monterrey, Nuevo León, Mexico		--	10-11				

Appendix D – Human Health Effects of Chemicals on the "Top 25" Lists for Releases and/or for Total Reported Amounts of Releases and Transfers

Note 1: Chemicals can have a variety of health and environmental effects, and the fact that a chemical is reported to NPRI or TRI does not mean that it is considered to pose toxic risks to humans. In some cases, chemicals may be of greater concern for their effects on ecosystems. For example, a relatively non-toxic chemical may serve as an excess nutrient in aquatic systems, leading to a buildup of algae that can deplete oxygen, killing fish and other aquatic life (eutrophication). Other chemicals may be of concern because they contribute to acid precipitation, or lead to the formation of tropospheric ozone (photochemical smog). Furthermore, all effects are dose-dependent and may not occur at levels found in the environment or associated with PRTR releases. Effects shown in workers are likely to reflect exposures significantly higher than those occurring in the environment. PRTRs do not collect data on exposures or risks associated with the releases they report.

Note 2: The information in this table was drawn from three sources:

- *ToxFAQs*, distributed by the US Agency for Toxic Substances and Disease Registry <http://www.atsdr.cdc.gov/toxfaq.html>
- *Chemical Fact Sheets* distributed by the Office of Pollution Prevention and Toxics of the US Environmental Protection Agency <http://www.epa.gov/chemfact/>
- *Hazardous Substance Fact Sheets*, distributed by the New Jersey Department of Health and Senior Services (DHSS) <http://www.state.nj.us/health/eoh/rtkweb/rtkhsfs.htm>

These sources were considered in the above order, such that if multiple sources documented toxic effects, information from the ATSDR was taken first, followed by that from the US EPA and then that from the NJ DHSS.

CAS Number	Name	Source	High Exposure Effects	Longer and Lower Exposure Effects
75-07-0	Acetaldehyde	EPA	Inhalation can irritate respiratory system. Contact with liquid or vapor irritates eyes and skin.	Limited evidence from animal studies shows effects on the developing fetus. Repeated inhalation in animals can severely damage respiratory tract and cause cancer.
75-05-8	Acetonitrile	EPA	Effects range from abnormal salivation, vomiting, confusion, rapid breathing and heart rate to coma and death. Contact with liquid or vapor is irritating to skin, eyes, nose and throat.	Adverse effects on blood, nervous system, lungs, liver and thymus, as well as fetal toxicity in laboratory studies.
7429-90-5	Aluminum (fume or dust)	ATSDR	Inhalation effects include coughing and asthma. Large doses administered in medical settings have led to bone disease.	Delay skeletal and neurological development in laboratory studies. Association with Alzheimer's disease of uncertain nature.
71-36-3	n-Butyl alcohol	DHSS	Inhalation leads to headaches, shortness of breath, irregular heartbeat. Contact with liquid or vapor irritates eyes, nose, and throat. Contact with liquid irritates skin. Can cause nausea, vomiting, or dizziness.	Can damage liver, heart and kidneys. Damages hearing and sense of balance. Repeated contact may cause drying and cracking of skin. Limited evidence that it is a teratogen (reproductive hazard) in animals.
75-15-0	Carbon disulfide	ATSDR	Inhalation effects include headache, fatigue, sleep disturbance, breathing changes, and chest pains. Skin burns from dermal contact.	Nervous system effects in workers. Effects on brain, liver, and heart, as well as fetal toxicity in laboratory studies.
7782-50-5	Chlorine	EPA	Effects range from coughing and chest pain to water retention in the lungs; irritation to skin, eyes, and respiratory system.	Adverse effects on immune system, blood, heart, and respiratory system in laboratory studies.
--	Chromium (and its compounds)	ATSDR	Hexavalent forms (Cr VI) are more toxic than trivalent (Cr III). Inhalation effects include irritation/damage to nose, lungs, stomach, and intestines. Some persons exhibit allergic reactions and high exposure may trigger asthma. Ingestion can cause stomach upset and ulcers, convulsions, damage to kidneys and liver, and even death.	Some chromium VI compounds are ***known human carcinogens***, based both on cases with exposed workers and on laboratory studies. Animal studies indicate reproductive effects and fetal toxicity.
--	Copper (and its compounds)	ATSDR	Exposure to dust and fumes can irritate eyes, nose and throat. May also cause "metal fume fever," with symptoms similar to flu, dizziness, headaches and diarrhea. Onset may be delayed for hours or days following exposure.	Repeated high exposure can affect liver, kidneys and blood. Drinking water containing higher-than-normal levels can cause vomiting, diarrhea, stomach cramps, and nausea.
75-09-2	Dichloromethane	ATSDR	Inhalation effects include slower reaction time, loss of fine motor control, dizziness, nausea, tingling or numbness in fingers and toes, increasing up to unconsciousness or death. Dermal contact causes burning sensation and skin reddening; contact with eyes can burn cornea.	Impairment of hearing and vision. Causes ***cancer*** in laboratory studies.

Appendix D – Human Health Effects of Chemicals on the "Top 25" Lists for Releases and/or for Total Reported Amounts of Releases and Transfers (*continued*)

CAS Number	Name	Source	High Exposure Effects	Longer and Lower Exposure Effects
74-85-1	Ethylene	DHSS	Inhalation can cause dizziness, lightheadedness, leading to unconsciousness. Skin contact with liquid can cause frostbite.	None listed.
107-21-1	Ethylene glycol	ATSDR	Ingestion can lead to nausea, convulsions, slurred speech, disorientation, heart and kidney problems, or death; also, increased acidity of body tissues (metabolic acidosis).	Fetal toxicity has been observed after large doses in laboratory studies.
50-00-0	Formaldehyde	ATSDR	Can cause irritation of the skin, eyes, nose, and throat. Ingestion of large amounts can cause severe pain, vomiting, coma and possible death.	Causes ***cancer*** of the nasal passages in laboratory studies or rats. Low levels can irritation of the eyes, nose, throat, and skin. People with asthma may be more sensitive.
110-54-3	n-Hexane	ATSDR	Inhalation of large amounts causes numbness in hands and feet, followed by muscle weakness in the feet and lower legs.	Causes nerve and lung damage in laboratory studies of rats.
7647-01-0	Hydrochloric acid	DHSS	Inhalation can irritate the lungs, as well as mouth, nose and throat; higher exposures can lead to fluid buildup (pulmonary edema)—a medical emergency. Dermal contact can cause severe, permanent eye and skin damage.	Repeated inhalation can lead to bronchitis. Exposure to vapor may cause erosion of teeth. Some evidence of increased incidence of lung ***cancer*** in exposed workers.
7664-39-3	Hydrogen fluoride	DHSS	Inhalation effects include damage to nose, throat and lungs, causing coughing and/or shortness of breath. Can lead to a build-up of fluid in the lungs (pulmonary edema)—a medical emergency, with severe shortness of breath. Dermal contact will burn skin and eyes.	Irritation of eyes, skin, and lungs. Repeated exposures may cause bronchitis. Long-term exposure may damage liver and kidneys.
--	Lead (and its compounds)	ATSDR	Exposure can affect almost every organ and system; most sensitive is central nervous system, particularly in children. Kidneys and immune system also affected. Exposure during pregnancy causes premature births, growth deficits and mental impairment in offspring.	Effects are more commonly observed after higher exposures.
--	Manganese (and its compounds)	ATSDR	Inhalation can affect motor skills such as steadiness of hands, rapid hand movements and balance. Exposure can cause respiratory problems and sexual dysfunction.	Repeated exposure may cause brain damage, mental and emotional disturbances and cause slow and clumsy body movements. These symptoms are called "manganism."
67-56-1	Methanol	EPA	Ingestion can result in headaches and coordination problems to severe pain in abdomen, leg, and back, and even blindness in cases of inebriation.	Headaches, sleep disorders, and gastrointestinal problems ranging up to optic nerve damage have been reported in workers and in laboratory studies.
78-93-3	Methyl ethyl ketone	DHSS	Contact can severely irritate and burn eyes, leading to permanent damage. Inhalation effects include irritation of nose, throat, and mouth, causing coughing and wheezing. Can cause dizziness, headache, nausea, and blurred vision.	Repeated exposure can damage nervous system and may affect the brain, reducing memory, concentration, and coordination, and inducing personality changes, fatigue, and sleep disturbances. Limited evidence that it is a teratogen (reproductive hazard) in animals.

Appendix D – Human Health Effects of Chemicals on the "Top 25" Lists for Releases and/or for Total Reported Amounts of Releases and Transfers (*continued*)

CAS Number	Name	Source	High Exposure Effects	Longer and Lower Exposure Effects
108-10-1	Methyl isobutyl ketone	EPA	Effects range from headaches, dizziness, nausea and numbness in fingers and toes to unconsciousness and death. Vapor irritates eyes, nose and throat. Liquid irritates eyes and skin.	Has caused nausea, headaches, weakness, and adverse liver effects in workers. Kidney and liver effects, as well as fetal toxicity observed in laboratory studies.
--	Nickel (and its compounds)	ATSDR	Inhalation effects include bronchitis and reduced lung function. Ingestion leads to stomach problems, blood, and kidney effects, as well as liver, immune system, and reproductive effects in laboratory studies	Small amounts are essential for animal nutrition, may be the case for humans. Skin exposure causes allergic rashes. ***Cancer*** of lungs and nasal sinuses seen in nickel workers; inhalation of insoluble nickel compounds caused cancer in laboratory studies.
--	Nitric acid and nitrate compounds	DHSS	Inhalation of nitric acid can irritate the lungs, as well as mouth, nose and throat; higher exposures can lead to fluid buildup (pulmonary edema)—a medical emergency. Dermal contact can cause severe, permanent eye and skin damage.	Exposure to vapor may cause erosion of teeth.
100-42-5	Styrene	ATSDR	Inhalation effects include depression, trouble concentrating, muscle weakness, fatigue, and nausea; possibly irritation of eye, nose, and throat. Laboratory studies show damage to nose and liver, reproductive and fetal toxicity. Ingestion led to damage of liver, kidney, brain, and lungs in laboratory studies.	Studies not reported.
7664-93-9	Sulfuric acid	ATSDR	Inhalation can irritate the lungs. Ingestion can burn mouth, throat, and stomach and result in death. Contact with skin and eyes can cause third-degree burns and blindness.	Exposure to vapor may cause chronic runny nose, tearing of the eyes, nosebleeds and stomach upset, as well as erosion and pitting of teeth. Evidence of increased ***cancer*** of the larynx in exposed workers who smoke.
108-88-3	Toluene	ATSDR	Dizziness, fatigue, unconsciousness and death. Permanent brain and nervous system damage from repeated high-level exposure, including speech damage, vision and hearing problems, loss of muscle control and poor balance. Also affects kidneys and leads to fetal toxicity.	Fatigue, confusion, weakness, appearance of intoxication, memory loss, nausea, loss of appetite, hearing loss.
--	Vanadium (and its compounds)	ATSDR	Inhalation can cause lung irritation, coughing, wheezing, chest pain, a runny nose and sore throat.	High levels in the water given to pregnant laboratory animals resulted in minor birth defects. Some animals had minor kidney or liver changes after breathing or ingesting over a long term.
--	Xylenes	ATSDR	Effects include headaches, lack of coordination, dizziness, confusion, and changes in balance. Short-term exposure to high levels can also cause irritation of skin, eyes, nose, and throat, difficulty breathing, lung problems, delayed reaction time, memory difficulties, stomach discomfort, and possibly liver and kidney changes; unconsciousness and death at highest levels.	Prolonged exposure can lead to headaches, lack of coordination, dizziness, confusion, and changes in balance. Fetal toxicity observed in high-dose laboratory studies.
--	Zinc (and its compounds)	ATSDR	Ingestion of high concentrations can lead to stomach cramps, nausea, and vomiting. Inhalation can cause "metal fume fever," probably an immune reaction of lungs and body temperature.	Zinc is an essential element in the human diet. Prolonged ingestion of excessive levels can cause anemia, damage to pancreas, and reduction of beneficial cholesterol. Insufficient zinc during pregnancy may lead to growth retardation in children; laboratory animals fed large amounts became infertile or had smaller babies.

Appendix E – Uses of Chemicals on the "Top 25" Lists for Releases and/or for Total Reported Amounts of Releases and Transfers

Note 1: Releases and transfers reported to PRTRs may result from particular uses of the listed substances themselves. For example, many of the PRTR-listed substances are used as chemical agents in the production of other substances. Many also serve as solvents, which may be used in industrial processes or in cleaning (such as removing grease and oil from metal parts). PRTR-listed substances may be constituents of products sold for consumer uses, such as pesticides. Uses of chemicals reported in large amounts in 2002 are summarized below. However, uses described in this table and in other sources do not necessarily represent the majority of sources of releases and transfers of a substance. Releases and transfers also result from generation of listed substances as byproducts of production processes. A prime example is methanol, generated as a byproduct of a variety of processes, including chemical wood pulping for paper manufacture and the production of anhydrous ammonia (a fertilizer).

Note 2: Information for this table was drawn from:

- *ChemExpo* Commercial Chemical Profiles <http://www.chemexpo.com/>
- *ToxFAQs*, Agency for Toxic Substances and Disease Registry <http://www.atsdr.cdc.gov/>
- *Chemical Fact Sheets*, US EPA, Office of Pollution Prevention and Toxics <http://www.epa.gov/chemfact/>
- *Chemical Backgrounders*, Environment Writer, National Safety Council's Environmental Health Center <http://www.nsc.org/EHC/ew/chemical.htm>
- *Kirk-Othmer Concise Encyclopedia of Chemical Technology* (New York and Toronto: John Wiley & Sons, 1985).

CAS Number	Name	Uses
75-07-0	Acetaldehyde	Acetaldehyde is principally used in production of other chemicals, especially acetic acid and related substances; for such chemicals as pyridine, pentaerythritoal and peracetic acid; and in producing perfumes, polyester resins and dyes. It is used as a denaturant for alcohol and in fuel compositions and as a solvent in the rubber, tanning and paper industries. In the food industries, acetaldehyde is used to preserve fruit and fish, as a flavoring agent, and to harden gelatin.
75-05-8	Acetonitrile	Acetonitrile is used by the chemicals industry primarily to extract inorganic and organic chemicals, especially butadiene. It is also used in the manufacture of pesticides.
7429-90-5	Aluminum (fume or dust)	Aluminum is often used for cooking utensils, containers (including cans and packaging), appliances and building materials, also in automotive and aircraft manufacture. Aluminum is a component of paints and fireworks and is employed in the production of glass, rubber and ceramics. Compounds of aluminum are used in antacids and deodorants and to treat drinking water.
71-36-3	n-Butyl alcohol	The main use (more than half) of n-butyl alcohol is in the production of butyl acrylate and methacrylate esters, used in making latex (water-based) paints. It is added to plastics, hydraulic fluids and detergent formulations, and is used by the pharmaceutical industry as an extractant and as an additive in certain medicines.
75-15-0	Carbon disulfide	Carbon disulfide's primary use (more than half) is in the production of rayon. It is also used to produce chemicals for agriculture (fumigants), and for the manufacture of rubber and cellophane. Sometimes it is used as an industrial solvent, including for metal cleaning. Formerly, a principal use was as a feedstock in the production of carbon tetrachloride, an ozone-depleting chemical.
7782-50-5	Chlorine	Chlorine is used to make ethylene dichloride/vinyl chloride, polyurethanes and other organic chemicals; as a bleach in pulp and paper production; and in water and wastewater treatment.
--	Chromium (and its compounds)	Chromium is used in steel and other alloys, in making refractories (bricks used in industrial furnaces), dyes and pigments, and in plating chrome, tanning leather and preserving wood. Chromium and its compounds are also used as cleaning agents in electroplating, as mordants in textile manufacture and in other processes.
--	Copper (and its compounds)	Copper is used in electrical and electronic products, building construction and industrial machinery and equipment. Copper and its compounds appear in electroplated coatings, cooking utensils, piping, dyes and dyeing processes, wood preservatives and pesticides, and in mildew preventives, corrosion inhibitors, fuel additives, for printing and photocopying, and in pigments for glass and ceramics production. Copper compounds are also used as catalysts, as a purifying agent in the petroleum industry and in alloys and metal refining.
75-09-2	Dichloromethane	Dichloromethane is widely used as a solvent in paint strippers, including furniture strippers, home paint removers and aircraft maintenance products. It is used as a solvent and degreasing agent in metal cleaning and in pharmaceutical production processes. Also, it is used in the production of plastics (polycarbonate and triacetate fiber) and polyurethane foam. Other uses include electronics manufacture, film processing, food processing and production of pesticides, synthetic fibers, paints and coatings. It is no longer widely used as an aerosol propellant.
74-85-1	Ethylene	Ethylene is principally used (more than half) in producing low- and high-density polyethylenes. It also serves as an intermediate in the production of vinyl chloride, ethylene oxide, ethylbenzene and other chemicals. It is used as a solvent, a refrigerant, a raw material for anesthetics and medications. It is also used to regulate plant growth, as a compressed gas, and to ripen various fruits.

Appendix E – Uses of Chemicals on the "Top 25" Lists for Releases and/or for Total Reported Amounts of Releases and Transfers (*continued*)

CAS Number	Name	Uses
107-21-1	Ethylene glycol	The primary use of ethylene glycol (about one-third) is in antifreeze and de-icing solutions (for cars, airplanes, and boats). It is also used in manufacturing polyester fiber and PET resins (for bottles and film); as a solvent by the paint and plastics industries; and as a constituent of photographic developing solutions, hydraulic brake fluids and inks.
50-00-0	Formaldehyde	The largest use of formaldehyde is in the production of resins, including urea-formaldehyde (UF) and phenolic resins (which are used for making particleboard and plywood, respectively) and acetal resins. It is also used in production of acetylenic chemicals (butanediol), methylene diisocyanate (MDI) and other industrial chemical products, and it serves as a preservative in medical laboratories and as an embalming fluid and sterilizer.
110-54-3	n-Hexane	Mixed with similar chemicals, n-hexane is used as a solvent. A major use is for extracting vegetable oils from crops such as soybeans. Hexane-based solvents are also used as cleaning agents in printing, textile, furniture, and shoemaking industries. It is contained in special glues used in roofing, and in the shoemaking and leather industries. It is also a component of gasoline, of quick-drying glues used in various hobbies and in rubber cement.
7647-01-0	Hydrochloric acid	Uses of hydrochloric acid include brine treatment for chloralkali processes, steel pickling, food processing (including production of corn syrup) and the production of calcium chloride. It is also used in oil well acidulation (to stimulate oil and gas production), production of chlorine and in water treatment for swimming pools. Other uses (together representing more than 40 percent of usage) include metal recovery from used catalysts, pH control, sludge removal, sand and clay purification and production of inorganics such as sodium chlorate, metal chlorides, activated carbon and iron oxide pigments and organics like polycarbonate resins, bisphenol-A, polyvinyl chloride resins and synthetic glycerine. Hydrochloric acid is also a byproduct of the manufacture of isocyanates.
7664-39-3	Hydrogen fluoride	Hydrogen fluoride is used mainly in the production of aluminum and chlorofluorocarbons (CFCs). It is also used in oil well acidulation (to stimulate oil and gas production); in froth flotation (to separate metals from ores); as a chemical intermediary for fluorocarbons, aluminum fluoride, cryolite, uranium hexafluoride, and fluoride salts; in fluorination processes (especially in the aluminum industry, in dye chemistry and in fluoride manufacture); as a catalyst (especially in the petroleum industry); and in alkylation, isomerization, condensation, dehydration, and polymerization reactions. Aside from its uses in chemical synthesis, hydrogen fluoride is used as a cleaning agent (for cast iron, copper, brass, brick and stone) and in etching and polishing.
--	Lead (and its compounds)	The most important use of lead is in producing batteries. It is also used in ammunition, metal products (solder and pipes), roofing and devices to shield X-rays. The use of lead in gasoline, paints and ceramic products, caulking and pipe solder has been dramatically reduced. Lead compounds appear in dyes, explosives, asbestos brake linings, insecticides and rodenticides, ointments and other products. Lead is also used as a catalyst, a cathode material, a flame retardant, for metal and wire coating material, as an agent or constituent in glass manufacture, and as an agent for recovering precious metals, notably gold.
--	Manganese (and its compounds)	Manganese is used in steel production to improve hardness, stiffness and strength. Manganese compounds are used in production of dry-cell batteries, in glazes, ceramics and fertilizers, as fungicides, as oxidizing agents and disinfectants and in other uses.
67-56-1	Methanol	The largest use of methanol in the United States has been in production of methyl tert-butyl ether (MTBE), added to gasoline to improve octane and reduce hydrocarbons and carbon monoxide (concerns about its safety have been raised in both Canada and the United States). Methanol is used in production of formaldehyde, acetic acid, chloromethanes, methyl methacrylate, and as a solvent in paint strippers, aerosol spray paints, wall paints, carburetor cleaners and windshield washing products. Methanol also finds uses in coating wood and paper, in producing synthetic fibers (acetate and triacetate), and in manufacturing pharmaceuticals.

Appendix E – Uses of Chemicals on the "Top 25" Lists for Releases and/or for Total Reported Amounts of Releases and Transfers (*continued*)

CAS Number	Name	Uses
78-93-3	Methyl ethyl ketone	The largest use (two-thirds) of methyl ethyl ketone is as a solvent in protective surface coatings, although this use is decreasing. It is also added to adhesives, used in lubrication oil dewaxing, added to printing inks, and used in manufacture of organic chemicals, including drugs and cosmetics.
108-10-1	Methyl isobutyl ketone	The largest use (two-thirds) of methyl isobutyl ketone is as a solvent in protective surface coatings, although this application is decreasing. It is also added to adhesives; used in production of other chemicals, including rubber antioxidants and acetylenic surfactants (for inks, paints and pesticides); and in solvent extraction.
--	Nickel (and its compounds)	In alloys, nickel is used in making metal coins and jewelry and metal parts for industrial uses. Nickel compounds are also used for nickel plating (electroplating), in nickel-cadmium battery manufacture, to color ceramics and as catalysts.
--	Nitric acid and nitrate compounds	The chief use of nitric acid is in producing ammonium nitrate fertilizer. It is also used in the manufacture of cyclohexanone and as a raw material for adipic acid and caprolactam, both of which are used in making nylon. Nitrates are used in producing explosives, including gunpowder.
100-42-5	Styrene	The main application of styrene (two-thirds) is as a monomer in producing polystyrene. It is also used in the production of acrylonitrile-butadiene-styrene (ABS) resins and acrylonitrile-sytrene resins. These are used in automobile parts, appliances (including refrigerators and freezers), pipe, business machines, luggage and recreational goods. Styrene is also used in the production of styrene-butadiene latex and rubber, unsaturated polyester resins, thermoplastic elastomers and various styrene copolymers.
7664-93-9	Sulfuric acid	The principal use (almost three-quarters) of sulfuric acid is in fertilizer production, where it is generally produced by the fertilizer manufacturers themselves. Sulfuric acid generated during smelting is sold for numerous chemical and industrial uses, but is also used in leaching copper. Industrial uses include the production of explosives, other acids, dyestuffs, glue, wood preservatives and lead-acid vehicle batteries. Sulfuric acid is also used in purifying petroleum, pickling metal, electroplating and nonferrous metallurgy.
108-88-3	Toluene	By far, the largest use is in gasoline; most toluene is never separated from petroleum crude oil (its largest source) but is pumped from refineries to other locations where it is added directly to gasoline. Toluene "recovered" from crude oil is principally used to make benzene. Toluene is also a byproduct of the coking of coal and the production of styrene. In addition to its use as a gasoline additive, it is also incorporated into paints, lacquers, thinners and strippers, adhesives, and cosmetic nail products.
--	Vanadium (and its compounds)	Most vanadium in the United States is used to make steel; is also mixed with iron to make parts for aircraft engines. Small amounts are used in making rubber, plastics, ceramics and other chemicals. Vanadium oxide is component in specialty steels used to make automobile parts, springs, and ball bearings.
--	Xylenes	These chemicals are used as solvents in the printing, rubber and leather industries; as cleaning agents; as thinners for paint; and in paints and varnishes.
--	Zinc (and its compounds)	The most common use of zinc is in galvanizing metals (including steel). Zinc is also used in dry cell batteries and in alloys such as brass and bronze. Zinc compounds are used in production of paint, rubber, dye, wood preservatives and ointments. Zinc sulfate, as one example, is used principally in fertilizers, but also in animal feed, water treatment, chemical manufacture and froth flotation (to extract metals from ore).

(IMPORTANT: Type or print; read instructions before completing form)

Form Approved OMB Number: 2070-0093
Approval Expires: 01/31/2003

EPA
United States Environmental Protection Agency

FORM R

TOXIC CHEMICAL RELEASE INVENTORY REPORTING FORM

Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986, also known as Title III of the Superfund Amendments and Reauthorization Act

WHERE TO SEND COMPLETED FORMS:
1. EPCRA Reporting Center
P.O Box 3348
Merrifield, VA 22116-3348
ATTN: TOXIC CHEMICAL RELEASE INVENTORY
2. APPROPRIATE STATE OFFICE (See instructions in Appendix F)

Enter "X" here if this is a revision

For EPA use only

Important: See instructions to determine when "Not Applicable (NA)" boxes should be checked.

PART I. FACILITY IDENTIFICATION INFORMATION

SECTION 1. REPORTING YEAR __________

SECTION 2. TRADE SECRET INFORMATION

2.1 Are you claiming the toxic chemical identified on page 2 trade secret?
☐ Yes (Answer question 2.2; Attach substantiation forms)
☐ No (Do not answer 2.2; Go to Section 3)

2.2 Is this copy ☐ Sanitized ☐ Unsanitized
(Answer only if "YES" in 2.1)

SECTION 3. CERTIFICATION (Important: Read and sign after completing all form sections.)

I hereby certify that I have reviewed the attached documents and that, to the best of my knowledge and belief, the submitted information is true and complete and that the amounts and values in this report are accurate based on reasonable estimates using data available to the preparers of this report.

Name and official title of owner/operator or senior management official:	Signature:	Date Signed:

SECTION 4. FACILITY IDENTIFICATION

4.1 | TRI Facility ID Number

Facility or Establishment Name	Facility or Establishment Name or Mailing Address(if different from street address)
Street	Mailing Address
City/County/State/Zip Code	City/State/Zip Code — Country (Non-US)

4.2 This report contains information for:
(Important : check a or b; check c or d if applicable)
a. ☐ An entire facility b. ☐ Part of a facility c. ☐ A Federal facility d. ☐ GOCO

4.3	Technical Contact Name		Telephone Number (include area code)
4.4	Public Contact Name		Telephone Number (include area code)

4.5	SIC Code (s) (4 digits)	Primary a.	b.	c.	d.	e.	f.

4.6	Latitude	Degrees	Minutes	Seconds	Longitude	Degrees	Minutes	Seconds

4.7 Dun & Bradstreet Number(s) (9 digits)	4.8 EPA Identification Number (RCRA I.D. No.) (12 characters)	4.9 Facility NPDES Permit Number(s) (9 characters)	4.10 Underground Injection Well Code (UIC) I.D. Number(s) (12 digits)
a.	a.	a.	a.
b.	b.	b.	b.

SECTION 5. PARENT COMPANY INFORMATION

5.1	Name of Parent Company	NA ☐
5.2	Parent Company's Dun & Bradstreet Number	NA ☐

EPA Form 9350-1 (Rev. 01/2001) - Previous editions are obsolete.

EPA FORM R
PART II. CHEMICAL-SPECIFIC INFORMATION

TRI Facility ID Number

Toxic Chemical, Category or Generic Name

SECTION 1. TOXIC CHEMICAL IDENTITY (Important: DO NOT complete this section if you completed Section 2 below.)

1.1	CAS Number (Important: Enter only one number exactly as it appears on the Section 313 list. Enter category code if reporting a chemical category.)
1.2	Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.)
1.3	Generic Chemical Name (Important: Complete only if Part 1, Section 2.1 is checked "yes". Generic Name must be structurally descriptive.)

1.4 Distribution of Each Member of the Dioxin and Dioxin-like Compounds Category.
(If there are any numbers in boxes 1-17, then every field must be filled in with either 0 or some number between 0.01 and 100. Distribution should be reported in percentages and the total should equal 100%. If you do not have speciation data available, indicate NA.)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
NA ☐																	

SECTION 2. MIXTURE COMPONENT IDENTITY (Important: DO NOT complete this section if you completed Section 1 above.)

2.1	Generic Chemical Name Provided by Supplier (Important: Maximum of 70 characters, including numbers, letters, spaces, and punctuation.)

SECTION 3. ACTIVITIES AND USES OF THE TOXIC CHEMICAL AT THE FACILITY
(Important: Check all that apply.)

3.1 Manufacture the toxic chemical:	3.2 Process the toxic chemical:	3.3 Otherwise use the toxic chemical:
a. ☐ Produce b. ☐ Import		
If produce or import:	a. ☐ As a reactant	a. ☐ As a chemical processing aid
c. ☐ For on-site use/processing	b. ☐ As a formulation component	b. ☐ As a manufacturing aid
d. ☐ For sale/distribution	c. ☐ As an article component	c. ☐ Ancillary or other use
e. ☐ As a byproduct	d. ☐ Repackaging	
f. ☐ As an impurity	e. ☐ As an impurity	

SECTION 4. MAXIMUM AMOUNT OF THE TOXIC CHEMICAL ONSITE AT ANY TIME DURING THE CALENDAR YEAR

4.1 ☐ (Enter two-digit code from instruction package.)

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM ONSITE

			A. Total Release (pounds/year*) (Enter range code or estimate**)	B. Basis of Estimate (enter code)	C. % From Stormwater
5.1	Fugitive or non-point air emissions	NA ☐			
5.2	Stack or point air emissions	NA ☐			
5.3	Discharges to receiving streams or water bodies (enter one name per box)				
	Stream or Water Body Name				
5.3.1					
5.3.2					
5.3.3					

If additional pages of Part II, Section 5.3 are attached, indicate the total number of pages in this box ☐ and indicate the Part II, Section 5.3 page number in this box. ☐ (example: 1,2,3, etc.)

* For Dioxin or Dioxin-like compounds, report in grams/year

** Range Codes: A= 1 - 10 pounds; B= 11- 499 pounds; C= 500 - 999 pounds.

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EPA FORM R PART II. CHEMICAL - SPECIFIC INFORMATION (CONTINUED)	TRI Facility ID Number
	Toxic Chemical, Category or Generic Name

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM ONSITE (Continued)

		NA	A. **Total Release** (pounds/year*) (enter range code** or estimate)	B. **Basis of Estimate** (enter code)
5.4.1	Underground Injection onsite to Class I Wells	☐		
5.4.2	Underground Injection onsite to Class II-V Wells	☐		
5.5	Disposal to land onsite			
5.5.1A	RCRA Subtitle C landfills	☐		
5.5.1B	Other landfills	☐		
5.5.2	Land treatment/application farming	☐		
5.5.3	Surface Impoundment	☐		
5.5.4	Other disposal	☐		

SECTION 6. TRANSFERS OF THE TOXIC CHEMICAL IN WASTES TO OFF-SITE LOCATIONS

6.1 DISCHARGES TO PUBLICLY OWNED TREATMENT WORKS (POTWs)

6.1.A Total Quantity Transferred to POTWs and Basis of Estimate

6.1.A.1. Total Transfers (pounds/year*) (enter range code** or estimate)	**6.1.A.2 Basis of Estimate** (enter code)

6.1.B.__	POTW Name						
POTW Address							
City		State		County		Zip	
6.1.B.__	POTW Name						
POTW Address							
City		State		County		Zip	

If additional pages of Part II, Section 6.1 are attached, indicate the total number of pages in this box ☐ **and indicate the Part II, Section 6.1 page number in this box** ☐ **(example: 1,2,3, etc.)**

SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS

6.2. ___ Off-Site EPA Identification Number (RCRA ID No.)									
Off-Site Location Name									
Off-Site Address									
City		State		County		Zip		Country (Non-US)	
Is location under control of reporting facility or parent company?						☐ Yes		☐ No	

* For Dioxin or Dioxin-like compounds, report in grams/year

** Range Codes: A = 1 - 10 pounds; B = 11 - 499 pounds; C = 500 - 999 pounds.

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EPA FORM R

PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI Facility ID Number

Toxic Chemical, Category or Generic Name

SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS (Continued)

A. Total Transfers (pounds/year*) (enter range code** or estimate)	**B. Basis of Estimate** (enter code)	**C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery** (enter code)
1.	1.	1. M
2.	2.	2. M
3.	3.	3. M
4.	4.	4. M

6.2. ___ Off-Site EPA Identification Number (RCRA ID No.)

Off-Site location Name

Off-Site Address

City		State		County		Zip		Country (Non-US)	

Is location under control of reporting facility or parent company? ☐ Yes ☐ No

A. Total Transfers (enter range code** or estimate)	**B. Basis of Estimate** (enter code)	**C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery** (enter code)
1.	1.	1. M
2.	2.	2. M
3.	3.	3. M
4.	4.	4. M

SECTION 7A. ON-SITE WASTE TREATMENT METHODS AND EFFICIENCY

☐ Not Applicable (NA) - Check here if no on-site waste treatment is applied to any waste stream containing the toxic chemical or chemical category.

a. General Waste Stream (enter code)	b. Waste Treatment Method(s) Sequence [enter 3-character code(s)]	c. Range of Influent Concentration	d. Waste Treatment Efficiency Estimate	e. Based on Operating Data ?
7A.1a	**7A. 1b** 1 2 3 4 5 6 7 8	**7A. 1c**	**7A. 1d** %	**7A. 1e** Yes ☐ No ☐
7A.2a	**7A. 2b** 1 2 3 4 5 6 7 8	**7A. 2c**	**7A. 2d** %	**7A. 2e** Yes ☐ No ☐
7A.3a	**7A. 3b** 1 2 3 4 5 6 7 8	**7A. 3c**	**7A. 3d** %	**7A. 3e** Yes ☐ No ☐
7A.4a	**7A. 4b** 1 2 3 4 5 6 7 8	**7A. 4c**	**7A. 4d** %	**7A. 4e** Yes ☐ No ☐
7A.5a	**7A. 5b** 1 2 3 4 5 6 7 8	**7A. 5c**	**7A. 5d** %	**7A. 5e** Yes ☐ No ☐

If additional pages of Part II, Section 6.2/7A are attached, indicate the total number of pages in this box ☐
and indicate the Part II, Section 6.2/7A page number in this box : ☐ **(example: 1,2,3, etc)**

* For Dioxin or Dioxin-like compounds, report in grams/year

** Range Codes: A = 1 - 10 pounds; B = 11 - 499 pounds; C = 500 - 999 pounds.

EPA Form 9350-1 (Rev. 01/2001) - Previous editions are obsolete.

EPA FORM R
PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI Facility ID Number
Toxic Chemical, Category or Generic Name

SECTION 7B. ON-SITE ENERGY RECOVERY PROCESSES

☐ Not Applicable (NA) - Check here if no on-site energy recovery is applied to any waste stream containing the toxic chemical or chemical category.

Energy Recovery Methods [enter 3-character code(s)]

1 ☐ 2 ☐ 3 ☐ 4 ☐

SECTION 7C. ON-SITE RECYCLING PROCESSES

☐ Not Applicable (NA) - Check here if no on-site recycling is applied to any waste stream containing the toxic chemical or chemical category.

Recycling Methods [enter 3-character code(s)]

1. ☐ 2. ☐ 3. ☐ 4. ☐ 5. ☐

6. ☐ 7. ☐ 8. ☐ 9. ☐ 10. ☐

SECTION 8. SOURCE REDUCTION AND RECYCLING ACTIVITIES

		Column A Prior Year (pounds/year*)	Column B Current Reporting Year (pounds/year*)	Column C Following Year (pounds/year*)	Column D Second Following Year (pounds/year*)
8.1	Quantity released **				
8.2	Quantity used for energy recovery onsite				
8.3	Quantity used for energy recovery offsite				
8.4	Quantity recycled onsite				
8.5	Quantity recycled offsite				
8.6	Quantity treated onsite				
8.7	Quantity treated offsite				
8.8	Quantity released to the environment as a result of remedial actions, catastrophic events, or one-time events not associated with production processes (pounds/year)				
8.9	Production ratio or activity index				

8.10	Did your facility engage in any source reduction activities for this chemical during the reporting year? If not, enter "NA" in Section 8.10.1 and answer Section 8.11.			
	Source Reduction Activities [enter code(s)]	Methods to Identify Activity (enter codes)		
8.10.1		a.	b.	c.
8.10.2		a.	b.	c.
8.10.3		a.	b.	c.
8.10.4		a.	b.	c.
8.11	Is additional information on source reduction, recycling, or pollution control activities included with this report ? (Check one box)			YES ☐ NO ☐

* For Dioxin or Dioxin-like compounds, report in grams/year

** Report releases pursuant to EPCRA Section 329(8) including "any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping or disposing into the environment." Do not include any quantity treated onsite.

EPA Form 9350-1 (Rev. 01/2001) - Previous editions are obsolete.

NPRI - The National Pollutant Release Inventory

PART A - FACILITY IDENTIFICATION

All fields are mandatory unless otherwise noted.
PLEASE PRINT.
For additional information please refer to the
2002 *Guide for Reporting to the National Pollutant Release Inventory*.

A1.0	Reporting Year:	2002	
A1.1	NPRI ID:		
A1.4	Web Site Address:	http://	(Optional)
A1.5	D&B D-U-N-S Number:	__ __ - __ __ __ - __ __ __ __	(Optional)

A2.0	FACILITY IDENTIFICATION & SITE ADDRESS	
A2.1	Company Name:	
A2.2	Facility Name:	
A2.3	Street Address:	
A2.4	Street Address:	
A2.5	City / District:	
A2.6	Province / Territory:	
A2.7	Postal Code:	

A3.0	PARENT COMPANY INFORMATION	
A3.1	Is the facility controlled by another company or companies?	( ) Y ( ) N If YES, please use Appendix A.

A4.0	FACILITY PUBLIC CONTACT (Optional)			
A4.1	Title:	Dr. ( ) Mr. ( ) Mrs. ( ) Miss ( ) Ms. ( )		
A4.2	First Name:			
A4.3	Last Name:			
A4.4	Position:			
A4.5 - 6	Telephone N°:	( ) -	Ext.:	
A4.7 - 8	Facsimile N°:	( ) -		
A4.8	E-mail Address:			

A5.0	FACILITY PUBLIC CONTACT ADDRESS (Optional)			
Is the mailing address for the public contact in A4.0 different from the facility's site address in A2.0?		( ) Y ( ) N If YES, please provide the address below.		
A5.1	Company Name:			
A5.2	Facility Name:			
A5.3	Mailing Address:			
A5.4	Mailing Address:			
A5.5	City / District:			
A5.6 - 7	Province / Territory:		Postal Code:	
A5.8 - 9	State:		Zip Code/Other:	
A5.10	Country:			

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Part A / Page 1

NPRI - The National Pollutant Release Inventory

PART A - FACILITY IDENTIFICATION

A6.0	FACILITY TECHNICAL CONTACT			
A6.1	Title:	Dr. ( ) Mr. ( ) Mrs. ( ) Miss ( ) Ms. ( )		
A6.2	First Name:			
A6.3	Last Name:			
A6.4	Position:			
A6.5 - 6	Telephone Nº:	( ) -	Ext.:	
A6.7	Facsimile Nº:	( ) -		
A6.8	E-mail Address:			

A7.0	FACILITY TECHNICAL CONTACT ADDRESS			
Is the mailing address for the technical contact in A6.0 different from the facility's site address in A2.0?		( ) Y ( ) N If YES, please provide the address below.		
A7.1	Company Name:			
A7.2	Facility Name:			
A7.3	Mailing Address:			
A7.4	Mailing Address:			
A7.5	City / District:			
A7.6 - 7	Province / Territory:		Postal Code:	
A7.8 - 9	State:		Zip Code/Other:	
A7.10	Country:			

A8.0	COMPANY COORDINATOR (Optional)			
Send information to a central contact?		( ) Y ( ) N If YES, please provide the information below.		
A8.1	Title:			
A8.2	First Name:			
A8.3	Last Name:			
A8.4	Position:			
A8.5 - 6	Telephone Nº:	( ) -	Ext.:	
A8.7	Facsimile Nº:	( ) -		
A8.8	E-mail Address:			

A9.0	COMPANY COORDINATOR ADDRESS (Optional)			
Is the mailing address for the company coordinator in A8.0 different from the A2.0 facility site address?		( ) Y ( ) N If YES, please provide the address below.		
A9.1	Company Name:			
A9.2	Facility Name:			
A9.3	Mailing Address:			
A9.4	Mailing Address:			
A9.5	City / District:			
A9.6 - 7	Province / Territory:		Postal Code:	
A9.8 - 9	State:		Zip Code/Other:	
A9.10	Country:			

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NPRI - The National Pollutant Release Inventory

PART A - FACILITY IDENTIFICATION

A10.0	**STANDARD INDUSTRIAL CLASSIFICATION CODE (SIC) AND THE NORTH AMERICAN INDUSTRIAL CLASSIFICATION SYSTEM CODE (NAICS)**	
A10.2	**4-Digit Canadian SIC Code:**	__ __ __ __
A10.3	**4-Digit American SIC Code:**	__ __ __ __
A10.6	**6-Digit NAICS Code:**	__ __ __ __ __ __

A11.0	**NUMBER OF FULL-TIME EMPLOYEES OR EQUIVALENT**	
A11.1	**Number of Employees:**	
A11.2	**ACTIVITIES FOR WHICH THE 20 000-HOUR EMPLOYEE THRESHOLD DOES NOT APPLY**	
A11.2.1	**Was the facility used for: (Check the choices that apply)**	
a)	( )	Non-hazardous solid waste incineration (≥100 tonnes / year)
b)	( )	Biomedical or hospital waste incineration (≥100 tonnes / year)
c)	( )	Hazardous waste incineration
d)	( )	Sewage sludge incineration
e)	( )	Wood preservation
f)	( )	None of the above

A12.0	**ACTIVITIES RELEVANT TO REPORTING DIOXINS/FURANS AND HEXACHLOROBENZENE**	
A12.1	**Was the facility engaged in: (Check the choices that apply)**	
a)	( )	Non-hazardous solid waste incineration ≥=100 tonnes / year)
b)	( )	Biomedical or hospital waste incineration (≥100 tonnes / year)
c)	( )	Hazardous waste incineration
d)	( )	Sewage sludge incineration
e)	( )	Base metals smelting (including copper, lead, nickel and zinc)
f)	( )	Smelting of secondary lead
g)	( )	Smelting of secondary aluminum
h)	( )	Manufacturing of iron using a sintering process
i)	( )	Operation of electric arc furnaces in steel manufacturing
j)	( )	Operation of electric arc furnaces in steel foundries
k)	( )	Production of magnesium
l)	( )	Manufacturing of portland cement
m)	( )	Production of chlorinated organic solvents or chlorinated monomers
n)	( )	Combustion of fossil fuel in a boiler unit to produce electricity (Δ25 MW)
o)	( )	Combustion of salt-laden logs in pulp and paper sector
p)	( )	Combustion of fuel in kraft liquor boilers in pulp and paper sector
q)	( )	None of the above
A12.2	**Was the facility used for wood preservation using pentachlorophenol?**	( )Y ( )N

Note: If you have checked off any choices in **12.1a** to **12.1p**, or if you have answered **YES** to question **A12.2**, then you **must** use the *Dioxin/Furan and Hexachlorobenzene* declaration form.

A13.0	**ACTIVITIES RELEVANT TO THE REPORTING OF PAHs**	
A13.1	**Was the facility used for wood preservation using creosote?**	( )Y ( )N

A14.0	**OTHER ENVIRONMENTAL REGULATIONS AND PERMITS (Optional)**	
A14.1	**Do you report under other environmental regulations or permits?**	( ) Y ( ) N **If YES, please use Appendix B.**

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Part A / Page 3

NPRI - The National Pollutant Release Inventory

PART A - FACILITY IDENTIFICATION

A15.1	COMMENTS ON THE FACILITY (Optional)
A15.2	**COMMENTS ON POLLUTION PREVENTION ACTIVITIES (Optional)**

A16.0	COMPANY OFFICIAL CERTIFYING SUBMISSION			
A16.1	Title:	Dr. ( ) Mr. ( ) Mrs. ( ) Miss ( ) Ms. ( )		
A16.2	First Name:			
A16.3	Last Name:			
A16.4	Position:			
A16.5 - 6	Telephone N°:	( ) -	Ext.:	
A16.7 - 8	Facsimile N°:	( ) -		
A16.8	E-mail Address:			

A17.0	COMPANY OFFICIAL ADDRESS			
Is the mailing address for the company official in A16.0 different from the A2.0 facility site address?		( ) Y ( ) N If YES, please provide the address below.		
A17.1	Company Name:			
A17.2	Facility Name:			
A17.3	Mailing Address:			
A17.4	Mailing Address:			
A17.5	City / District:			
A17.6 - 7	Province/Territory:		Postal Code:	
A17.8 - 9	State:		Zip Code/Other:	
A17.10	Country:			

End of Form

Environment Canada Environnement Canada

2002 National Pollutant Release Inventory

Statement of Certification

I hereby certify that I have reviewed the attached documents, and that I exercised due diligence to ensure that the submitted information is true and complete and that the amounts and values are accurate, based on reasonable estimates using available data.

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NPRI ID Numbers, Facility / Company Name(s)

(Please type or print)

______________________	______________________
Name of Executive Contact (as identified in field A16.0 on the reporting form)	**Title**

(Please type or print)

______________________	______________________
Signature	**Date** (must be on or before June 1, 2003)

______________________	______________________
Telephone	**Facsimile**

(Please include area code)

NPRI - The National Pollutant Release Inventory

PART B - DECLARATION FORM FOR SCHEDULE 1, PART 1 SUBSTANCES, MERCURY (AND ITS COMPOUNDS) AND PAHs

Please photocopy Part B of the form for each reportable NPRI substance.
All fields are mandatory unless otherwise noted.
PLEASE PRINT
For additional information, refer to the 2002 Guide for Reporting to the National Pollutant Release Inventory and the Supplementary Guide for Reporting to the National Pollutant Release Inventory.

B1.0	SUBSTANCE IDENTITY			
B1.1	CAS Registry Number:			
B1.2	Substance Name:			
B1.3	NPRI substance category declared on this form (check one):			
a)	( )	Schedule 1, Part 1 Substance	UNITS:	tonnes (t)
b)	( )	PAHs	UNITS:	kilograms (kg)
c)	( )	Mercury (and its compounds)	UNITS:	kilograms (kg)

Note: The **UNITS** with the chosen substance category in the above table will be consistent throughout this form.

B2.0	NATURE OF ACTIVITIES (Select at least one activity)	
B2.1	MANUFACTURE THE SUBSTANCE	
a)	( )	For On-Site Use / Processing
b)	( )	For Sale / Distribution
c)	( )	As a By-product
d)	( )	As an Impurity
B2.2	PROCESS THE SUBSTANCE	
a)	( )	As a Reactant
b)	( )	As a Formulation Component
c)	( )	As an Article Component
d)	( )	Repackaging Only
e)	( )	As a By-product
B2.3	OTHERWISE USE THE SUBSTANCE	
a)	( )	As a Physical or Chemical Processing Aid
b)	( )	As a Manufacturing Aid
c)	( )	Ancillary / Other Use
d)	( )	As a By-product

B10.0	ON-SITE RELEASES TO THE ENVIRONMENT	
B10.1	Do you release this substance on-site?	( ) Y ( ) N If NO, go directly to section B14.0

B11.0	ON-SITE RELEASES OF LESS THAN ONE TONNE PART 1 SUBSTANCES ONLY	
B11.1	If the total on-site releases are less than 1 tonne, are you reporting this amount as a sum for all media?	( ) Y ( ) N If YES, go directly to section B12.5

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NPRI - The National Pollutant Release Inventory

PART B - DECLARATION FORM
FOR SCHEDULE 1, PART 1 SUBSTANCES, MERCURY (AND ITS COMPOUNDS) AND PAHs

B12.0		ON-SITE RELEASES OF THE SUBSTANCE TO THE ENVIRONMENT			
B12.1		AIR RELEASES	BASIS OF ESTIMATE (Select one method)	RELEASES (Units* / Year)	
	a	Stack or Point Releases	C / E / M / O		
	b	Storage or Handling Releases	C / E / M / O		
	c	Fugitive Releases	C / E / M / O		
	d	Spills	C / E / M / O		
	e	Other Non-Point Releases	C / E / M / O		
B12.2		UNDERGROUND INJECTION	C / E / M / O		
B12.3		RELEASES TO SURFACE WATERS	BASIS OF ESTIMATE (Select one method)	SURFACE WATER BODY CODES (Appendix B)	RELEASES (Units*/ Year)
	a	Direct Discharges	C / E / M / O		
	b	Spills	C / E / M / O		
	c	Leaks	C / E / M / O		
B12.4		RELEASES TO LAND	BASIS OF ESTIMATE (Select one method)	RELEASES (Units* / Year)	
	a	Landfill	C / E / M / O		
	b	Land Treatment	C / E / M / O		
	c	Spills	C / E / M / O		
	d	Leaks	C/ E / M / O		
	e	Other	C / E / M / O		
B12.5		TOTAL QUANTITY RELEASED			

B13.0	YEARLY BREAKDOWN OF RELEASES BY PERCENTAGE IN EACH QUARTER (Total must be 100 %)							
B13.1	(Jan.-March)		(April-June)		(July-Sept.)		(Oct.-Dec.)	
	a)	%	b)	%	c)	%	d)	%

* As specified in field B1.3

Environment Canada Environnement Canada

NPRI - The National Pollutant Release Inventory

PART B - DECLARATION FORM FOR SCHEDULE 1, PART 1 SUBSTANCES, MERCURY (AND ITS COMPOUNDS) AND PAHs

B14.0		REASONS FOR CHANGES IN QUANTITIES RELEASED FROM PREVIOUS YEAR (Select at least one reason)
B14.1 a	( )	Changes in Production Levels
b	( )	Changes in Estimation Methods
c	( )	Pollution Prevention Activities
d	( )	Changes in On-site Treatment
e	( )	Changes in Off-site Transfers for Disposal
f	( )	Changes in Off-site Transfers for Recycling
g	( )	Other (specify in comments field B14.2)
h	( )	No Significant Change (i.e. < 10%) or No Change
i	( )	Not Applicable (first year reporting this substance)
B14.2		COMMENTS ON RELEASES (Optional):

B15.0	ANTICIPATED RELEASES (Units* / Year)					
B15.1	2003		2004		2005	
	a)		b)		c)	
	2006 (Optional)		2007 (Optional)			
	d)		e)			

B20.0	DO YOU TRANSFER THIS SUBSTANCE TO OFF-SITE LOCATIONS	
B20.1	For Disposal?	( ) Y ( ) N
B20.2	For Recycling?	( ) Y ( ) N

B21.0		REASONS WHY SUBSTANCE WAS TRANSFERRED OFF-SITE FOR DISPOSAL or RECYCLING (Select at least one reason). Fill in this section if you answered YES at B20.1 and/or B20.2
a	( )	Production Residues
b	( )	Off-specification Products
c	( )	Expiration Date Passed
d	( )	Contaminated Materials
e	( )	Unusable Parts or Discards
f	( )	Pollution Abatement Residues
g	( )	Machining or Finishing Residues
h	( )	Site Remediation Residues
i	( )	Other

* As specified in field B1.3

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NPRI - The National Pollutant Release Inventory

PART B - DECLARATION FORM
FOR SCHEDULE 1, PART 1 SUBSTANCES, MERCURY (AND ITS COMPOUNDS) AND PAHs

B22.0	OFF-SITE TRANSFERS FOR DISPOSAL Fill in this section if you answered YES at question B20.1			
B22.1	DISPOSAL METHOD	BASIS OF ESTIMATE (Select one method)	AMOUNT (Units* / Year)	OFF-SITE CODES (See Appendix C)
a	Physical Treatment	C / E / M / O		
b	Chemical Treatment	C / E / M / O		
c	Biological Treatment	C / E / M / O		
d	Incineration / Thermal	C / E / M / O		
e i	Containment: Landfill	C / E / M / O		
e ii	Containment: Other Storage	C / E / M / O		
f	Municipal Sewage Treatment Plant	C / E / M / O		
g	Underground Injection	C / E / M / O		
h	Land Treatment	C / E / M / O		
B22.2	TOTAL QUANTITY DISPOSED			

B23.0	REASONS FOR CHANGES IN QUANTITIES DISPOSED FROM PREVIOUS YEAR (Select at least one reason)	
B23.1 a	( )	Changes in Production Levels
b	( )	Changes in Estimation Methods
c	( )	Pollution Prevention Activities
d	( )	Changes in On-site Treatment
f	( )	Changes in Off-site Transfers for Recycling
g	( )	Other (specify in comments field B23.2)
h	( )	No Significant Change (i.e. < 10%) or No Change
i	( )	Not Applicable (first year reporting this substance)
B23.2	COMMENTS ON DISPOSALS (Optional)	

B24.0	ANTICIPATED DISPOSALS (Units* / Year)					
B24.1	2003		2004		2005	
	a)		b)		c)	
	2006 (Optional)		2007 (Optional)			
	d)		e)			

* As specified in field B1.3

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NPRI - The National Pollutant Release Inventory

PART B - DECLARATION FORM
FOR SCHEDULE 1, PART 1 SUBSTANCES, MERCURY (AND ITS COMPOUNDS) AND PAHs

B25.0	OFF-SITE TRANSFERS FOR RECYCLING Fill in this section if you answered YES at question B20.2			
B25.1	RECYCLING ACTIVITY	BASIS OF ESTIMATE (Select one method)	RECYCLING (Units* / Year)	OFF-SITE CODES (see Appendix C)
a	Energy Recovery	C / E / M / O		
b	Recovery of Solvents	C / E / M / O		
c	Recovery of Organic Substances (not Solvents)	C / E / M / O		
d	Recovery of Metals and Metal Compounds	C / E / M / O		
e	Recovery of Inorganic Materials (not Metals)	C / E / M / O		
f	Recovery of Acids and Bases	C / E / M / O		
g	Recovery of Catalysts	C / E / M / O		
h	Recovery of Pollution Abatement Residues	C / E / M / O		
i	Refining or Re-use of Used Oil	C / E / M / O		
j	Other	C / E / M / O		
B25.2	TOTAL QUANTITY REC.			

B26.0	REASONS FOR CHANGES IN QUANTITIES RECYCLED FROM PREVIOUS YEAR (Select at least one reason)	
B26.1 a	( )	Changes in Production Levels
b	( )	Changes in Estimation Methods
c	( )	Pollution Prevention Activities
d	( )	Changes in On-site Treatment
e	( )	Changes in Off-site Transfers for Disposal
g	( )	Other (specify in comments field B26.2)
h	( )	No Significant Change (< 10 %) or No Change
i	( )	Not Applicable (first year reporting this substance)
B26.2	COMMENTS ON RECYCLING (Optional)	

* As specified in field B1.3

Environment Canada Environnement Canada

NPRI - The National Pollutant Release Inventory

PART B - DECLARATION FORM FOR SCHEDULE 1, PART 1 SUBSTANCES, MERCURY (AND ITS COMPOUNDS) AND PAHs

B27.0	ANTICIPATED RECYCLING (Units* / Year)					
B27.1	2003		2004		2005	
	a)		b)		c)	
	2006 (Optional)		2007 (Optional)			
	e)		d)			

B30.0	POLLUTION PREVENTION (P2) ACTIVITIES (Select at least one activity)		
B30.1 a	( )	Materials or Feedstock Substitution (Check choices that apply)	
	i.	( )	Increased purity of materials
	ii.	( )	Substituted materials
	iii.	( )	Other (Please specify in comments (B30.2) and identify field B30.1a)
	iv.	( )	Comments (Please specify in comments (B30.2) and identify field B30.1a)
b	( )	Product Design or Reformulation (Check choices that apply)	
	i.	( )	Changed product specifications
	ii.	( )	Modified design or composition
	iii.	( )	Modified packaging
	iv.	( )	Other (Please specify in comments (B30.2) and identify field B30.1b)
	v.	( )	Comments (Please specify in comments (B30.2) and identify field B30.1b)
c	( )	Equipment or Process Modifications (Check choices that apply)	
	i.	( )	Modified equipment, layout or piping
	ii.	( )	Use of a different process catalyst
	iii.	( )	Instituted better controls on operating bulk containers
	iv.	( )	Changed from small volume containers to bulk containers
	v.	( )	Modified stripping / cleaning devices
	vi.	( )	Changed to mechanical stripping / cleaning devices
	vii.	( )	Changed to aqueous cleaners
	viii.	( )	Modified or installed rinse systems
	ix.	( )	Improved rinse equipment design
	x.	( )	Improved rinse equipment operations
	xi.	( )	Modified spray systems or equipment
	xii.	( )	Improved application techniques
	xiii.	( )	Changed from spray to other system
	xiv.	( )	Other (Please specify in comments (B30.2) and identify field B30.1c)
	xv.	( )	Comments (Please specify in comments (B30.2) and identify field B30.1c)

* As specified in field B1.3

Environment Canada Environnement Canada

NPRI - The National Pollutant Release Inventory

PART B - DECLARATION FORM FOR SCHEDULE 1, PART 1 SUBSTANCES, MERCURY (AND ITS COMPOUNDS) AND PAHs

d	( )	Spill or Leak Prevention (Check choices that apply)	
	i.	( )	Improved storing or stacking procedures
	ii.	( )	Improved procedures for loading, unloading and transfer operations
	iii.	( )	Installed overflow alarms or automatic shut-off valves
	iv.	( )	Installed vapor recovery systems
	v.	( )	Implemented inspection or monitoring program of potential spill or leak sources
	vi.	( )	Modified containment procedures
	vii.	( )	Improved draining procedures
	viii.	( )	Other (Please specify in comments (B30.2) and identify field B30.1d)
	iv.	( )	Comments (Please specify in comments (B30.2) and identify field B30.1d)
e	( )	On-site Re-use, Recycling or Recovery (Check choices that apply)	
	i.	( )	Instituted recirculation within a process
	ii.	( )	Other (Please specify in comments (B30.2) and identify field B30.1e)
	iii.	( )	Comments (Please specify in comments (B30.2) and identify field B30.1e)
f	( )	Improved Inventory Management or Purchasing Techniques (Check choices that apply)	
	i.	( )	Instituted procedures to ensure that materials do not stay in inventory beyond shelf-life
	ii	( )	Initiated testing of outdated material
	iii.	( )	Eliminated shelf-life requirements for stable material
	iv.	( )	Instituted better labeling procedures
	v.	( )	Instituted clearinghouse to exchange materials
	vi.	( )	Instituted improved purchasing procedures
	vii.	( )	Other (Please specify in comments (B30.2) and identify field B30.1f)
	viii.	( )	Comments (Please specify in comments (B30.2) and identify field B30.1f)
g	( )	Good Operating Practices or Training (Check choices that apply)	
	i.	( )	Improved maintenance scheduling, record keeping or procedures
	ii.	( )	Changed production schedule to minimize equipment and feedstock changeovers
	iii.	( )	Training related to pollution prevention
	iv.	( )	Other (Please specify in comments (B30.2) and identify field B30.1g)
	v.	( )	Comments (Please specify in comments (B30.2) and identify field B30.1g)
h	( )	Other (specify in comments field B30.2 and identify field B30.1h)	
i	( )	No Pollution Prevention Activities	
B30.2	COMMENTS ON POLLUTION PREVENTION ACTIVITIES (Optional)		

B40.0	PRODUCTION RATIO / ACTIVITY INDEX (Optional)
B40.1	

End of Form

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NPRI - The National Pollutant Release Inventory

PART B - DECLARATION FORM FOR DIOXINS/FURANS AND HEXACHLOROBENZENE

Please photocopy Part B of the form for each reportable NPRI substance.
All fields are mandatory unless otherwise noted.
PLEASE PRINT
For additional information, refer to the 2002 *Guide for Reporting to the National Pollutant Release Inventory* and the 2001 *Supplementary Guide for Reporting to the National Pollutant Release Inventory*.

B1.0	**SUBSTANCE IDENTITY**			
B1.1	**CAS Registry Number:**			
B1.2	**Substance Name:**			
B1.3	**NPRI substance category declared on this form (check one):**			
d)	( )	**Dioxins/Furans**	**UNITS:**	**grams TEQ (g TEQ)**
e)	( )	**Hexachlorobenzene (HCB)**	**UNITS:**	**grams (g)**

Note: The **UNITS** with the chosen substance category in the above table will be consistent throughout this form.

B2.0	**NATURE OF ACTIVITIES (Select at least one activity)**	
B2.1	**MANUFACTURE THE SUBSTANCE**	
a)	( )	**For On-Site Use / Processing**
b)	( )	**For Sale / Distribution**
c)	( )	**As a By-product**
d)	( )	**As an Impurity**
B2.2	**PROCESS THE SUBSTANCE**	
a)	( )	**As a Reactant**
b)	( )	**As a Formulation Component**
c)	( )	**As an Article Component**
d)	( )	**Repackaging Only**
e)	( )	**As a By-product**
B2.3	**OTHERWISE USE THE SUBSTANCE**	
a)	( )	**As a Physical or Chemical Processing Aid**
b)	( )	**As a Manufacturing Aid**
c)	( )	**Ancillary / Other Use**
d)	( )	**As a By-product**

B10.0	**ON-SITE RELEASES TO THE ENVIRONMENT**	
B10.1	**Do you release this substance on-site?**	**( ) Y ( ) N** **If NO, go directly to section B14.0**

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NPRI - The National Pollutant Release Inventory

PART B - DECLARATION FORM FOR DIOXINS/FURANS AND HEXACHLOROBENZENE

B12.0	ON-SITE RELEASES OF THE SUBSTANCE TO THE ENVIRONMENT			
B12.1	AIR RELEASES	BASIS OF ESTIMATE (Select one method)	DETAIL CODE**	RELEASES (Units* / Year)
a	Stack or Point Releases	C / E / M / O / NA / NI	AL / BL / BQ	
b	Storage or Handling Releases	C / E / M / O / NA / NI	AL / BL / BQ	
c	Fugitive Releases	C / E / M / O / NA / NI	AL / BL / BQ	
d	Spills	C / E / M / O / NA / NI	AL / BL / BQ	
e	Other Non-Point Releases	C / E / M / O / NA / NI	AL / BL / BQ	
B12.2	UNDERGROUND INJECTION	C / E / M / O / NA / NI	AL / BL / BQ	

B12.3	RELEASES TO SURFACE WATERS	BASIS OF ESTIMATE (Select one method)	DETAIL CODE**	SURFACE WATER BODY CODES (Appendix B)	RELEASES (Units*/ Year)
a	Direct Discharges	C / E / M / O / NA / NI	AL / BL / BQ		
b	Spills	C / E / M / O / NA / NI	AL / BL / BQ		
c	Leaks	C / E / M / O / NA / NI	AL / BL / BQ		

B12.4	RELEASES TO LAND	BASIS OF ESTIMATE (Select one method)	DETAIL CODE**	RELEASES (Units* / Year)
a	Landfill	C / E / M / O / NA / NI	AL / BL / BQ	
b	Land Treatment	C / E / M / O / NA / NI	AL / BL / BQ	
c	Spills	C / E / M / O / NA / NI	AL / BL / BQ	
d	Leaks	C/ E / M / O / NA / NI	AL / BL / BQ	
e	Other	C / E / M / O / NA / NI	AL / BL / BQ	
B12.5	TOTAL QUANTITY RELEASED			

B13.0	YEARLY BREAKDOWN OF RELEASES BY PERCENTAGE IN EACH QUARTER (Total must be 100 %)							
B13.1	(Jan.-March)		(April-June)		(July-Sept.)		(Oct.-Dec.)	
	a)	%	b)	%	c)	%	d)	%

* As specified in field B1.3
** Select a Detail Code if M was chosen as basis of estimate, see the *Supplementary Guide* for more information.

Environment Canada Environnement Canada

NPRI - The National Pollutant Release Inventory

PART B - DECLARATION FORM FOR DIOXINS/FURANS AND HEXACHLOROBENZENE

B14.0		REASONS FOR CHANGES IN QUANTITIES RELEASED FROM PREVIOUS YEAR (Select at least one reason)
B14.1 a	( )	Changes in Production Levels
b	( )	Changes in Estimation Methods
c	( )	Pollution Prevention Activities
d	( )	Changes in On-site Treatment
e	( )	Changes in Off-site Transfers for Disposal
f	( )	Changes in Off-site Transfers for Recycling
g	( )	Other (specify in comments field B14.2)
h	( )	No Significant Change (i.e. < 10%) or No Change
i	( )	Not Applicable (first year reporting this substance)
B14.2		COMMENTS ON RELEASES (Optional):

B15.0	ANTICIPATED RELEASES (Units* / Year)					
B15.1	2003		2004		2005	
	a)		b)		c)	
	2006 (Optional)		2007 (Optional)			
	d)		e)			

B20.0	DO YOU TRANSFER THIS SUBSTANCE TO OFF-SITE LOCATIONS	
B20.1	For Disposal?	( ) Y ( ) N
B20.2	For Recycling?	( ) Y ( ) N

B21.0		REASONS WHY SUBSTANCE WAS TRANSFERRED OFF-SITE FOR DISPOSAL or RECYCLING (Select at least one reason). Fill in this section if you answered YES at B20.1 and/or B20.2
a	( )	Production Residues
b	( )	Off-specification Products
c	( )	Expiration Date Passed
d	( )	Contaminated Materials
e	( )	Unusable Parts or Discards
f	( )	Pollution Abatement Residues
g	( )	Machining or Finishing Residues
h	( )	Site Remediation Residues
i	( )	Other

* As specified in field B1.3

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NPRI - The National Pollutant Release Inventory

PART B - DECLARATION FORM FOR DIOXINS/FURANS AND HEXACHLOROBENZENE

B22.0	OFF-SITE TRANSFERS FOR DISPOSAL Fill in this section if you answered YES at question B20.1				
B22.1	DISPOSAL METHOD	BASIS OF ESTIMATE (Select one method)	DETAIL CODE**	AMOUNT (Units* / Year)	OFF-SITE CODES (See Appendix C)
a	Physical Treatment	C / E / M / O / NA / NI	AL / BL / BQ		
b	Chemical Treatment	C / E / M / O / NA / NI	AL / BL / BQ		
c	Biological Treatment	C / E / M / O / NA / NI	AL / BL / BQ		
d	Incineration / Thermal	C / E / M / O / NA / NI	AL / BL / BQ		
e i	Containment: Landfill	C / E / M / O / NA / NI	AL / BL / BQ		
e ii	Containment: Other Storage	C / E / M / O / NA / NI	AL / BL / BQ		
f	Municipal Sewage Treatment Plant	C / E / M / O / NA / NI	AL / BL / BQ		
g	Underground Injection	C / E / M / O / NA / NI	AL / BL / BQ		
h	Land Treatment	C / E / M / O / NA / NI	AL / BL / BQ		
B22.2	TOTAL QUANTITY DISPOSED				

B23.0		REASONS FOR CHANGES IN QUANTITIES DISPOSED FROM PREVIOUS YEAR (Select at least one reason)
B23.1 a	( )	Changes in Production Levels
b	( )	Changes in Estimation Methods
c	( )	Pollution Prevention Activities
d	( )	Changes in On-site Treatment
f	( )	Changes in Off-site Transfers for Recycling
g	( )	Other (specify in comments field B23.2)
h	( )	No Significant Change (i.e. < 10%) or No Change
i	( )	Not Applicable (first year reporting this substance)

B23.2	COMMENTS ON DISPOSALS (Optional)

* As specified in field B1.3

** Select a Detail Code if M was chosen as basis of estimate, see the Supplementary Guide for more information.

Environment Canada Environnement Canada

NPRI - The National Pollutant Release Inventory

PART B - DECLARATION FORM FOR DIOXINS/FURANS AND HEXACHLOROBENZENE

B24.0	ANTICIPATED DISPOSALS (Units* / Year)		
B24.1	2003	2004	2005
	a)		b)
	2006 (Optional)	2007 (Optional)	
	d)		e)

B25.0	OFF-SITE TRANSFERS FOR RECYCLING Fill in this section if you answered YES at question B20.2				
B25.1	RECYCLING ACTIVITY	BASIS OF ESTIMATE (Select one method)	DETAIL CODES**	RECYCLING (Units* / Year)	OFF-SITE CODES (see Appendix C)
a	Energy Recovery	C / E / M / O / NA / NI	AL / BL / BQ		
b	Recovery of Solvents	C / E / M / O / NA / NI	AL / BL / BQ		
c	Recovery of Organic Substances (not Solvents)	C / E / M / O / NA / NI	AL / BL / BQ		
d	Recovery of Metals and Metal Compounds	C / E / M / O / NA / NI	AL / BL / BQ		
e	Recovery of Inorganic Materials (not Metals)	C / E / M / O / NA / NI	AL / BL / BQ		
f	Recovery of Acids and Bases	C / E / M / O / NA / NI	AL / BL / BQ		
g	Recovery of Catalysts	C / E / M / O / NA / NI	AL / BL / BQ		
h	Recovery of Pollution Abatement Residues	C / E / M / O / NA / NI	AL / BL / BQ		
i	Refining or Re-use of Used Oil	C / E / M / O / NA / NI	AL / BL / BQ		
j	Other	C / E / M / O / NA / NI	AL / BL / BQ		
B25.2	TOTAL QUANTITY REC.				

B26.0	REASONS FOR CHANGES IN QUANTITIES RECYCLED FROM PREVIOUS YEAR (Select at least one reason)	
B26.1 a	( )	Changes in Production Levels
b	( )	Changes in Estimation Methods
c	( )	Pollution Prevention Activities
d	( )	Changes in On-site Treatment
e	( )	Changes in Off-site Transfers for Disposal
g	( )	Other (specify in comments field B26.2)
h	( )	No Significant Change (< 10 %) or No Change

* As specified in field B1.3
** Select a Detail Code if M was chosen as basis of estimate, see the Supplementary Guide for more information

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NPRI - The National Pollutant Release Inventory

PART B - DECLARATION FORM FOR DIOXINS/FURANS AND HEXACHLOROBENZENE

B26.2	COMMENTS ON RECYCLING (Optional)

B27.0	ANTICIPATED RECYCLING (Units* / Year)					
B27.1	2003		2004		2005	
	a)		b)		c)	
	2006 (Optional)		2007 (Optional)			
	e)		d)			

B30.0	POLLUTION PREVENTION (P2) ACTIVITIES (Select at least one activity)		
B30.1 a	( )	Materials or Feedstock Substitution (Check choices that apply)	
	i.	( )	Increased purity of materials
	ii.	( )	Substituted materials
	iii.	( )	Other (Please specify in comments (B30.2) and identify field B30.1a)
	iv.	( )	Comments (Please specify in comments (B30.2) and identify field B30.1a)
b	( )	Product Design or Reformulation (Check choices that apply)	
	i.	( )	Changed product specifications
	ii.	( )	Modified design or composition
	iii.	( )	Modified packaging
	iv.	( )	Other (Please specify in comments (B30.2) and identify field B30.1b)
	v.	( )	Comments (Please specify in comments (B30.2) and identify field B30.1b)
c	( )	Equipment or Process Modifications (Check choices that apply)	
	i.	( )	Modified equipment, layout or piping
	ii.	( )	Use of a different process catalyst
	iii.	( )	Instituted better controls on operating bulk containers
	iv.	( )	Changed from small volume containers to bulk containers
	v.	( )	Modified stripping / cleaning devices
	vi.	( )	Changed to mechanical stripping / cleaning devices
	vii.	( )	Changed to aqueous cleaners
	viii.	( )	Modified or installed rinse systems
	ix.	( )	Improved rinse equipment design
	x.	( )	Improved rinse equipment operations
	xi.	( )	Modified spray systems or equipment
	xii.	( )	Improved application techniques
	xiii.	( )	Changed from spray to other system

* As specified in field B1.3

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PART B - DECLARATION FORM FOR
DIOXINS/FURANS AND HEXACHLOROBENZENE

	xiv	( )	Other (Please specify in comments (B30.2) and identify field B30.1c)
	xv.	( )	Comments (Please specify in comments (B30.2) and identify field B30.1c)
d	( )	Spill or Leak Prevention (Check choices that apply)	
	i.	( )	Improved storing or stacking procedures
	ii.	( )	Improved procedures for loading, unloading and transfer operations
	iii.	( )	Installed overflow alarms or automatic shut-off valves
	iv.	( )	Installed vapor recovery systems
	v.	( )	Implemented inspection or monitoring program of potential spill or leak sources
	vi.	( )	Modified containment procedures
	vii.	( )	Improved draining procedures
	viii.	( )	Other (Please specify in comments (B30.2) and identify field B30.1d)
	iv.	( )	Comments (Please specify in comments (B30.2) and identify field B30.1d)
e	( )	On-site Re-use, Recycling or Recovery (Check choices that apply)	
	i.	( )	Instituted recirculation within a process
	ii.	( )	Other (Please specify in comments (B30.2) and identify field B30.1e)
	iii.	( )	Comments (Please specify in comments (B30.2) and identify field B30.1e)
f	( )	Improved Inventory Management or Purchasing Techniques (Check choices that apply)	
	i.	( )	Instituted procedures to ensure that materials do not stay in inventory beyond shelf-life
	ii	( )	Initiated testing of outdated material
	iii.	( )	Eliminated shelf-life requirements for stable material
	iv.	( )	Instituted better labeling procedures
	v.	( )	Instituted clearinghouse to exchange materials
	vi.	( )	Instituted improved purchasing procedures
	vii.	( )	Other (Please specify in comments (B30.2) and identify field B30.1f)
	viii.	( )	Comments (Please specify in comments (B30.2) and identify field B30.1f)
g	( )	Good Operating Practices or Training (Check choices that apply)	
	i.	( )	Improved maintenance scheduling, record keeping or procedures
	ii.	( )	Changed production schedule to minimize equipment and feedstock changeovers
	iii.	( )	Training related to pollution prevention
	iv.	( )	Other (Please specify in comments (B30.2) and identify field B30.1g)
	v.	( )	Comments (Please specify in comments (B30.2) and identify field B30.1g)
h	( )	Other (specify in comments field B30.2 and identify field B30.1h)	
i	( )	No Pollution Prevention Activities	
B30.2	COMMENTS ON POLLUTION PREVENTION ACTIVITIES (Optional)		

B40.0	PRODUCTION RATIO / ACTIVITY INDEX (Optional)
B40.1	

End of Form

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Part B / Page 7

NPRI - The National Pollutant Release Inventory

PART B - DECLARATION FORM FOR PART 4 SUBSTANCES (CACs)

Please photocopy this form for each reportable Part 4 NPRI substance.
All fields are mandatory unless otherwise noted.
PLEASE PRINT
For additional information, refer to the
2002 *Guide for Reporting to the National Pollutant Release Inventory*
and the 2002 *Software Guide for the National Pollutant Release Inventory*

B1.0	SUBSTANCE IDENTITY			
B1.1	CAS Registry Number:			
B1.2	Substance Name:			
B1.3	NPRI substance category declared on this form (check one):			
f)	(X)	Part 4 substance (CACs)	UNITS:	tonnes (t)

Note: The **UNITS** with the chosen substance category in the above table will be consistent throughout this form.

B1.5	This substance will be reported to the selected Inventory Program(s), checked below:							
	( )	NPRI	( )	AENV				

B12.0	ON-SITE RELEASES OF THE SUBSTANCE TO THE ENVIRONMENT			
B12.1	AIR RELEASES	BASIS OF ESTIMATE (Circle one method)	RELEASES (Units* / Year)	STACK CODE (Appendix D)
a	Stack or Point Releases	M1/M2/M3/C/E1/E2/O/SO		
b	Storage or Handling Releases	M1/M2/M3/C/E1/E2/O/SO		
c	Fugitive Releases	M1/M2/M3/C/E1/E2/O/SO		
d	Spills	M1/M2/M3/C/E1/E2/O/SO		
e	Other Non-Point Releases	M1/M2/M3/C/E1/E2/O/SO		
B12.5	TOTAL QUANTITY RELEASED T0 AIR :			

Note: If releases from more than one stack, please indicate breakdown of releases / stack.

* As specified in field B1.3

Environment Canada Environnement Canada

NPRI - The National Pollutant Release Inventory

PART B - DECLARATION FORM FOR PART 4 SUBSTANCES (CACs)

B13.0	MONTHLY BREAKDOWN OF RELEASES BY PERCENTAGE (Total must be 100 %)											
B13.1	Jan		%	Feb		%	Mar		%	Apr		%
	May		%	Jun		%	Jul		%	Aug		%
	Sep		%	Oct		%	Nov		%	Dec		%

B14.0	REASONS FOR CHANGES IN QUANTITIES RELEASED FROM PREVIOUS YEAR (Select at least one reason)	
B14.1 a	( )	Changes in Production Levels
b	( )	Changes in Estimation Methods
c	( )	Pollution Prevention Activities
d	( )	Changes in On-site Treatment
g	( )	Other (specify in comments field B14.2)
h	( )	No Significant Change (i.e. < 10%) or No Change
i	( )	Not Applicable (first year reporting this substance)
B14.2	COMMENTS ON RELEASES (Optional):	

B15.0	ANTICIPATED RELEASES (Units* / Year)					
B15.1	2003		2004		2005	
	a)		b)		c)	
	2006 (Optional)		2007 (Optional)		2006 – 2007 are mandatory fields for NERM reporters	
	d)		e)			

* As specified in field B1.3

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NPRI - The National Pollutant Release Inventory

PART B - DECLARATION FORM FOR PART 4 SUBSTANCES (CACs)

B30.0	POLLUTION PREVENTION (P2) ACTIVITIES (Select at least one activity)		
B30.1 a	( )	Materials or Feedstock Substitution (Check choices that apply)	
	i.	( )	Increased purity of materials
	ii.	( )	Substituted materials
	iii.	( )	Other (Please specify in comments (B30.2) and identify field B30.1a)
	iv.	( )	Comments (Please specify in comments (B30.2) and identify field B30.1a)
b	( )	Product Design or Reformulation (Check choices that apply)	
	i.	( )	Changed product specifications
	ii.	( )	Modified design or composition
	iii.	( )	Modified packaging
	iv.	( )	Other (Please specify in comments (B30.2) and identify field B30.1b)
	v.	( )	Comments (Please specify in comments (B30.2) and identify field B30.1b)
c	( )	Equipment or Process Modifications (Check choices that apply)	
	i.	( )	Modified equipment, layout or piping
	ii.	( )	Use of a different process catalyst
	iii.	( )	Instituted better controls on operating bulk containers
	iv.	( )	Changed from small volume containers to bulk containers
	v.	( )	Modified stripping / cleaning devices
	vi.	( )	Changed to mechanical stripping / cleaning devices
	vii.	( )	Changed to aqueous cleaners
	viii.	( )	Modified or installed rinse systems
	ix.	( )	Improved rinse equipment design
	x.	( )	Improved rinse equipment operations
	xi.	( )	Modified spray systems or equipment
	xii.	( )	Improved application techniques
	xiii	( )	Changed from spray to other system
	xiv	( )	Other (Please specify in comments (B30.2) and identify field B30.1c)
	xv.	( )	Comments (Please specify in comments (B30.2) and identify field B30.1c)
d	( )	Spill or Leak Prevention (Check choices that apply)	
	i.	( )	Improved storing or stacking procedures
	ii.	( )	Improved procedures for loading, unloading and transfer operations
	iii.	( )	Installed overflow alarms or automatic shut-off valves
	iv.	( )	Installed vapor recovery systems
	v.	( )	Implemented inspection or monitoring program of potential spill or leak sources
	vi.	( )	Modified containment procedures
	vii.	( )	Improved draining procedures
	viii.	( )	Other (Please specify in comments (B30.2) and identify field B30.1d)
	iv.	( )	Comments (Please specify in comments (B30.2) and identify field B30.1d)
e	( )	On-site Re-use, Recycling or Recovery (Check choices that apply)	
	i.	( )	Instituted recirculation within a process
	ii.	( )	Other (Please specify in comments (B30.2) and identify field B30.1e)
	iii.	( )	Comments (Please specify in comments (B30.2) and identify field B30.1e)

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NPRI - The National Pollutant Release Inventory

PART B - DECLARATION FORM FOR PART 4 SUBSTANCES (CACs)

f	( )	Improved Inventory Management or Purchasing Techniques (Check choices that apply)	
	i.	( )	Instituted procedures to ensure that materials do not stay in inventory beyond shelf-life
	ii	( )	Initiated testing of outdated material
	iii.	( )	Eliminated shelf-life requirements for stable material
	iv.	( )	Instituted better labeling procedures
	v.	( )	Instituted clearinghouse to exchange materials
	vi.	( )	Instituted improved purchasing procedures
	vii.	( )	Other (Please specify in comments (B30.2) and identify field B30.1f)
	viii.	( )	Comments (Please specify in comments (B30.2) and identify field B30.1f)
g	( )	Good Operating Practices or Training (Check choices that apply)	
	i.	( )	Improved maintenance scheduling, record keeping or procedures
	ii.	( )	Changed production schedule to minimize equipment and feedstock changeovers
	iii.	( )	Training related to pollution prevention
	iv.	( )	Other (Please specify in comments (B30.2) and identify field B30.1g)
	v.	( )	Comments (Please specify in comments (B30.2) and identify field B30.1g)
h	( )	Other (specify in comments field B30.2 and identify field B30.1h)	
i	( )	No Pollution Prevention Activities	
B30.2	COMMENTS ON POLLUTION PREVENTION ACTIVITIES (Optional)		

B40.0	PRODUCTION RATIO / ACTIVITY INDEX (Optional)
B40.1	Not Applicable

End of Form

Environment Canada Environnement Canada

NPRI - The National Pollutant Release Inventory

Appendix A
Parent Companies

NPRI ID: ____________

If you answered Yes in section A3.0, please list parent company or companies below.

	PARENT COMPANY			
P1.0	D&B D-U-N-S Number:	__ __ - __ __ __ - __ __ __ __ (Optional)		
P1.1	Ownership percentage:	%		
P1.2	Parent Company Name:			
P1.3	Mailing Address:			
P1.4	Mailing Address:			
P1.5	City / District:			
P1.6 - 7	Province / Territory:		Postal Code:	
P1.8 - 9	State:		Zip Code / Other:	
P1.10	Country:			

	PARENT COMPANY			
P1.0	D&B D-U-N-S Number:	__ __ - __ __ __ - __ __ __ __ (Optional)		
P1.1	Ownership percentage:	%		
P1.2	Parent Company Name:			
P1.3	Mailing Address:			
P1.4	Mailing Address:			
P1.5	City / District:			
P1.6 - 7	Province / Territory:		Postal Code:	
P1.8 - 9	State:		Zip Code / Other:	
P1.10	Country:			

	PARENT COMPANY			
P1.0	D&B D-U-N-S Number:	__ __ - __ __ __ - __ __ __ __ (Optional)		
P1.1	Ownership percentage:	%		
P1.2	Parent Company Name:			
P1.3	Mailing Address:			
P1.4	Mailing Address:			
P1.5	City / District:			
P1.6 - 7	Province / Territory:		Postal Code:	
P1.8 - 9	State:		Zip Code / Other:	
P1.10	Country:			

Environment Canada Environnement Canada

NPRI - The National Pollutant Release Inventory

Appendix B
Regulations & Permits and Surface Water Bodies

NPRI ID:

REGULATIONS OR PERMITS (Section A12.0) (Optional)		
	ID Number	Government Department, Agency or Program Name

	SURFACE WATER BODIES (Codes to be used in section B12.3)	
	Alphabetical Code	Name Surfacewater Body Name
	A	
	B	
	C	
	D	
	E	
	F	
	G	
	H	
	I	
	J	
	K	

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Appendix - B

NPRI - The National Pollutant Release Inventory

APPENDIX C
OFF-SITE FACILITIES

NPRI ID:

S1.0	OFF-SITE FACILITY (Codes to be used in sections B22.1, B25.1)			
S1.1	Off-Site Code:	01	Use off-site codes (e.g. 01, 02, 03) to indicate off-site facilities or MSTPs in sections B22.0 and B25.0	
S1.2	Off-Site Name:			
S1.3	Physical Address of ...			
S1.4	... Site Location			
S1.5	City / District:			
S1.6 - 7	Province / Territory:		Postal Code:	
S1.8 - 9	State:		Zip Code / Other:	
S1.10	Country:			

S1.0	OFF-SITE FACILITY (Codes to be used in sections B22.1, B25.1)			
S1.1	Off-Site Code:	02	Use off-site codes (e.g. 01, 02, 03.) to indicate off-site facilities or MSTPs in sections B22.0 and B25.0	
S1.2	Facility or MSTP Name:			
S1.3	Physical Address of ...			
S1.4	... Site Location			
S1.5	City / District:			
S1.6 - 7	Province / Territory:		Postal Code:	
S1.8 - 9	State:		Zip Code / Other:	
S1.10	Country:			

S1.0	OFF-SITE FACILITY (Codes to be used in sections B22.1, B25.1)			
S1.1	Off-Site Code:	03	Use off-site codes (e.g. 01, 02, 03) to indicate off-site facilities or MSTPs in sections B22.0 and B25.0	
S1.2	Facility or MSTP Name:			
S1.3	Physical Address of ...			
S1.4	... Site Location			
S1.5	City / District:			
S1.6 - 7	Province / Territory:		Postal Code:	
S1.8 - 9	State:		Zip Code / Other:	
S1.10	Country:			

End of Form

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NPRI - The National Pollutant Release Inventory

APPENDIX D
STACKS REPORTED

FOR NPRI FACILITY ID: _____________

S2.0	IDENTIFICATION OF STACKS (Stack IDs to be used in section B12.1 for reporting Part 4 substances (CACs))						
S2.1	Stack ID:	S01	Use stack codes (e.g. 01, 02, 03.) to indicate CAC releases in section B12.1				
S2.2	Stack Name/Description:						
S2.3	Height above grade:		Meters ($\geq$50 meters)				
S2.4	Equivalent diameter:		Meters				
S2.5	Exit Velocity:		m/s (Average)				
S2.6	Exit Temperature		^{0}C (Average)				
S2.7	Latitude (optional)	^{0}	′	″	Degrees (^{0})	Minutes (′)	Seconds (″)
S2.8	Longitude (optional)	^{0}	′	″	Degrees (^{0})	Minutes (′)	Seconds (″)

S2.0	IDENTIFICATION OF STACKS (Stack IDs to be used in section B12.1 for reporting Part 4 substances (CACs))						
S2.1	Stack ID:	S02	Use stack codes (e.g. 01, 02, 03.) to indicate CAC releases in section B12.1				
S2.2	Stack Name/Description:						
S2.3	Height above grade:		Meters ($\geq$50 meters)				
S2.4	Equivalent diameter:		Meters				
S2.5	Exit Velocity:		m/s (Average)				
S2.6	Exit Temperature		^{0}C (Average)				
S2.7	Latitude (optional)	^{0}	′	″	Degrees (^{0})	Minutes (′)	Seconds (″)
S2.8	Longitude (optional)	^{0}	′	″	Degrees (^{0})	Minutes (′)	Seconds (″)

S2.0	IDENTIFICATION OF STACKS (Stack IDs to be used in section B12.1 for reporting Part 4 substances (CACs))						
S2.1	Stack ID:	S03	Use stack codes (e.g. 01, 02, 03.) to indicate CAC releases in section B12.1				
S2.2	Stack Name/Description:						
S2.3	Height above grade:		Meters ($\geq$50 meters)				
S2.4	Equivalent diameter:		Meters				
S2.5	Exit Velocity:		m/s (Average)				
S2.6	Exit Temperature		^{0}C (Average)				
S2.7	Latitude (optional)	^{0}	′	″	Degrees (^{0})	Minutes (′)	Seconds (″)
S2.8	Longitude (optional)	^{0}	′	″	Degrees (^{0})	Minutes (′)	Seconds (″)

End of Form

Environment Canada Environnement Canada

Appendix - D

[Unofficial translation, for information only] 1

ANNUAL CERTIFICATE OF OPERATIONS (COA) FORM

ANNUAL CERTIFICATE OF OPERATIONS 20_____

POLLUTANT RELEASE AND TRANSFER REGISTER

SECRETARÍA DE MEDIO AMBIENTE Y RECURSOS NATURALES | SEMARNAT

ANNUAL CERTIFICATE OF OPERATIONS
FOR INDUSTRIAL ESTABLISHMENTS UNDER
FEDERAL JURISDICTION DURING THE YEAR 20_____

TO BE FILLED OUT BY SEMARNAT	
REGISTRATION NO. OF AUTOMATED FILING SYSTEM (SAT):	**DATE OF RECEIPT:**
RECEIVED BY: **Name and signature**	**(Receipt Stamp)**

The legal basis for the Annual Certificate of Operations is set forth in:

- General Law of Ecological Balance and Environmental Protection (LGEEPA): articles 109 BIS and 159 BIS.
    - LGEEPA Regulations on the Pollutant Release and Transfer Register: articles 4, 5, 6, 9, 10, 11, 12, 13, 15, 16 and 21.
    - LGEEPA Regulations on Air Pollution Prevention and Control: articles 11, 17 section II, 17 BIS and 21.
    - LGEEPA Regulations on Hazardous Waste: article 8 section XI.
- Law of National Waters: articles 85, 87 and 88 BIS section V.
    - Regulations to the Law of National Waters: articles 133 and 136.
- General Law for Waste Prevention and Comprehensive Management: article 46.

TO BE FILLED OUT BY THE INDUSTRIAL ESTABLISHMENT	Mark with an X the information filed through the Annual Certificate of Operations: ☐ Section I and II. The establishment is under federal air jurisdiction (see list in Exhibit A of the COA filing instructions). ☐ Section III. The establishment discharges wastewater that is received by nationally owned bodies. ☐ Section IV. The establishment generates hazardous waste or is a hazardous waste management service company. ☐ Section V. The establishment uses, produces, markets, releases and/or transfers substances subject to PRTR reporting.

ANNUAL CERTIFICATE OF OPERATIONS 20_____

REGISTRATION DATA

TO BE FILLED OUT BY THE INDUSTRIAL ESTABLISHMENT

1) NAME OR COMPANY NAME:		TAXPAYER ID:
2) UNIQUE REGISTRATION NUMBER OF ACCREDITED PERSONS (RUPA) or ENVIRONMENTAL REGISTRATION NUMBER (NRA): (See Trans. Art. 5 of LGEEPA Regulations on PRTR)	3) UNIQUE ENVIRONMENTAL LICENSE NO.: LAU- __ __/__ __ __ __ __ - __ __ __ __	4) OPERATING LICENSE NO.: ____________________
5) ESTABLISHMENT'S PRIMARY PRODUCTION ACTIVITY		
6) APPOINTED TECHNICIAN (Designated by the establishment for consultation and clarification of information, only if other than the legal representative) NAME:	☐ Internal	☐ External
7) CONSULTANT'S NAME OR COMPANY NAME: (Where the certificate has been prepared by a consultant)		
8) NAME AND SIGNATURE OF LEGAL REPRESENTATIVE OR REQUIRED INDIVIDUAL	9) PERSONAL ID NUMBER OF LEGAL REPRESENTATIVE OR REQUIRED INDIVIDUAL __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __	
I HEREBY STATE UNDER OATH that the information contained on this form and its schedules is true and may be verified by Semarnat when so required, and that any omission or inaccuracy may void the filing and/or imposition of the corresponding penalties.	**In order that this information submitted to the Secretariat may be accepted, it must be hand-signed by the legal representative or electronically signed by the reporting establishment, in accordance with articles 15 and 16 of the LGEEPA Regulations on the Pollutant Release and Transfer Register.**	

REGISTRATION DATA (CONTINUED)

10) ESTABLISHMENT'S ADDRESS

Population Center ( ) Industrial Park or Port ( ) Other ( ) Specify industrial park, port or other: ________________________________
Street (also indicate cross streets or point of reference): ____
Exterior No. and Interior No. or Block and Lot No.: ________________ District: _________________________________ Postal Code: ____________________________
Town (other than D.F.): _______________________ Municipality or Delegation: ______________________________ State: ____________________________
Telephone numbers (include long-distance codes): ____ Fax (include long-distance code): ____________________________
Email(s) : ____

11) DOMICILE AND OTHER MEANS TO HEAR AND RECEIVE NOTICES (Only if other than the establishment's address)

Street (also indicate cross streets or point of reference): ____
Exterior No. and Interior No. or Block and Lot No.: ________________ District: _________________________________ Postal Code: ____________________________
Town (other than D.F.): _______________________ Municipality or Delegation: ______________________________ State: ____________________________
Telephone numbers (include long-distance codes): ____ Fax (include long-distance code): ____________________________
Email (s): ____

12) GEOGRAPHICAL LOCATION UTM coordinates: X = _______ (m) Y = _______ (m) o

Geographical coordinates:

North latitude: ☐☐ degrees ☐☐ minutes ☐☐ seconds

West longitude: ☐☐☐ degrees ☐☐ minutes ☐☐ seconds

Indicate the (Universal Transversal Mercator--UTM) or geographical coordinates. The COA reporting program automatically generates the UTM units. For further information on UTM cartographical coordinates and UTM zones, see Chapter 5 (Section 5.2) of the COA filing instructions.

UTM ZONE_______
ALTITUDE

☐☐☐☐

Meters above sea level

13) PERSONNEL

Total no. of administrative employees: _________
Total no. of plant workers: _________

14) PLANT WORKING HOURS AND WEEKS

Monday to Friday _______hours/day
Saturday____________ hours/day
Sunday ____________ hours/day
Weeks/yr _________

15) PLANT OPERATIONS START DATE: Day ☐☐ Month ☐☐ Year ☐☐☐☐

16) SHAREHOLDERS:
Only national ( ) Majority national ( ) Majority foreign ( ) Only foreign( )

17) DATA ON LAST NAME CHANGE
Date of change: Day ☐☐ Month ☐☐ Year ☐☐☐☐

Previous name: ____
Previous RUPA or NRA: ____

18) MEMBERSHIP CHAMBER AND REGISTRATION NO.:

19) PARENT COMPANY INFORMATION
Name: ____
Location: Country ________________ State or Province ___________________
Dun and Bradstreet Number ____

20) ESTABLISHMENT'S DUN AND BRADSTREET NUMBER. Only the establishment has such number (for further information see Section 5.3 of the COA filing instructions).
____

SECTION I. GENERAL TECHNICAL INFORMATION

This first section requests all process information: inputs, products and byproducts and the industrial establishment's fuel consumption. It includes an operating flowchart and essential information for linking, understanding and validating the data in the various sections of the Annual Certificate of Operations (releases and transfers into the air, water and subsoil, and hazardous waste and wastewater discharges received by national water bodies), to be included in the Pollutant Release and Transfer Register database.

1.1 OPERATIONS

Prepare and submit the *Operation Flowcharts* and the *Summary Table* following the example included in Chapter 3 of the COA filing instructions, showing the information requested in the various sections. The operation flowcharts and summary table should include all steps in production and auxiliary services within the establishment, graphically identifying the use of inputs and water, fuel consumption, air emissions, water discharges, hazardous waste generation, energy loss and waste and wastewater transfers, using the following symbols (See Chapter 3 of the COA filing instructions):

KEY

INPUTS	RELEASES AND/OR EMISSIONS	SUBSTANCE TRANSFER (in wastewater and wastes)	
Input entry	Release of pollutants into atmosphere		Total transfer
Fuel consumption	Discharge of wastewater received by nationally owned bodies (water release)		Partial transfer
Water usage	On-site release of PRTR materials and substances into soil	**REU**	Reuse
		REC	Recycling
	Hazardous waste generation	**COP**	Coprocessing
		TRA	Treatment
	Solid waste generation	**DIF**	Final disposal
		ALC	Sewer
		OTR	Other
	Release of energy		

ANNUAL CERTIFICATE OF OPERATIONS 20_____

1.2 INPUTS. Includes all inputs involved in the process and auxiliary services. This table does not include the annual fuel consumption for power.

Inputs involved in	Name[4]			Point of consumption[5]	Physical state[6]	Form of storage[7]	Annual consumption	
	Commercial	Chemical	CAS No.				Quantity	Unit[8]
Process[1,2]								
Auxiliary services[3]								

1 Production process to generate a good or service, or as applicable a hazardous waste or wastewater treatment process (in these last two cases, when it is the primary activity).
2 Indicate the chemical substances, compounds and fuels used in the process as raw materials.
3 Activities or equipment that are auxiliary in the production process, for example: furnaces, cooling systems, bathrooms, kitchens, maintenance, loaders, etc.
4 Provide the commercial and chemical name of the inputs used. In the case of pure substances, provide the Chemical Abstract Service (CAS) number. When not applicable, enter NA. When the information is not available, enter ND.
5 Enter the number appearing on the operations flowcharts and summary table, corresponding to the point (equipment, process, etc.) where the reported input is used.
6 Indicate whether it is gaseous (GP), nonaqueous liquid (LN), aqueous liquid, (LA), solid (S) or semisolid (SS).
7 Indicate whether the storage type is bulk roofed (GT), bulk unroofed (GI), metal drum (TAM), metal tank (TAN), plastic bag (BP), plastic container (CP), cardboard container (CC) or other (OF), specify. Use more than one code as needed.
8 Annual consumption is reported in units of mass: mg/yr (milligrams/year), g/yr (grams/year), kg/yr (kilograms/year), t/yr (metric tons/year) or lb/yr (pounds/year), or volume: L/yr (liters/year), gal/yr (gallons/year), brl/yr (barrels/year), m^3/yr (cubic meters/year) or ft^3/yr (cubic feet/year).

1.3 PRODUCTS AND BYPRODUCTS. (Not including byproducts and formulated fuels produced and consumed at the same plant)

Name of product or byproduct	Chemical name[1]	Physical state[2]	Form of storage[3]	Installed production capacity[4]	Annual production	
					Quantity	Unit[5]

1 Report the chemical name of the product or byproduct when available. If not applicable enter NA, or when not available enter ND.
2 Indicate whether the product or byproduct is gaseous (GP), nonaqueous liquid (LN), aqueous liquid, (LA), solid (S) or semisolid (SS).
3 Indicate whether the storage type is bulk roofed (GT), bulk unroofed (GI), metal drum (TAM), metal tank (TAN), plastic bag (BP), plastic container (CP), cardboard container (CC) or other (OF), specify. Use more than one code as needed.
4 Indicate the plant production capacity in the same units as reported for annual production.
5 Annual production is reported in units of mass: mg/yr (milligrams/year), g/yr (grams/year), kg/yr (kilograms/year), t/yr (metric tons/year) or lb/yr (pounds/year); units of volume: L/yr (liters/year), gal/yr (gallons/year), brl/yr (barrels/year), m^3/yr (cubic meters/year), ft^3 /yr (cubic feet/year); or units/yr or pieces/year.

1.4 FUEL CONSUMPTION

1.4.1 Annual consumption of fuels for power.

Consumption area	Fuel type[1]	Annual consumption	
		Quantity	Unit[2]
Production process and auxiliary services			
Electrical power self-generation			

1 Indicate whether the fuel used is natural gas (GN), LP gas (LP), heavy fuel-oil (CBP), light fuel-oil (CBL), gasoil (GO), diaphanous (DF), diesel (DI), gasoline (GA), coal (CA), coal coke (CCA), oil coke (CPE), bagasse (BG), cellulose (CL), wood (MA), formulated fuels (RC), specify which, or others (RO), entering the name of the fuel in the same space. When not applicable enter NA.

2 Annual fuel consumption is reported in units of mass: mg/yr (milligrams/year), g/yr (grams/year), kg/yr (kilograms/year), t/yr (metric tons/year) or lb/yr (pounds/year), or volume: L/yr (liters/year), gal/yr (gallons/year), brl/yr (barrels/year), m^3/yr (cubic meters/year) or ft^3 /yr (cubic feet/year).

1.4.2 Annual electrical power consumption.

Annual consumption	Quantity[1]	Unit[2]
Outside supply		

1 Indicate the annual quantity of outside-supplied electrical power. When not applicable enter NA.

2 To report annual consumption of outside-supplied electrical power use units of: KWhr (kilowatt hours)or MWhr (megawatt hours).

SECTION II. REGISTER OF AIR POLLUTION RELEASES

Releases of sulfur dioxide (SO_2), nitrous oxide (NO_X), total suspended particles (TSP), carbon monoxide (CO), carbon dioxide (CO_2), total hydrocarbons (THC) and volatile organic compounds (VOCs) are reported pursuant to the Mexican Official Standards in effect, as are the characteristics of the machinery, equipment or activity that generated the release and the characteristics of the ducts and stacks through which the releases are carried. For this section, consult the codes in Tables 4.1, 4.2, 4.3, 4.4, 4.5 and 4.6 of the COA filing instructions code catalog.

2.1 GENERATION OF AIR POLLUTANTS (gases and/or solid or liquid particles)

2.1.1 Characteristics of the pollutant-generating machinery, equipment or activity.

Equipment machinery, or activity code[1]	Point of generation[2]	Operating time (hours/year)	Type of release[3]	Equipment capacity[4]		Combustion equipment and/or release-generating activity			
						Type of burner[5]	Annual fuel consumption		
				Quantity	Unit[4]		Type[6]	Quantity	Unit[7]

1 Indicate the code of the facility, equipment, machinery or activity code where air pollutants are generated, in accordance with Tables 4.1 and 4.2 of the COA filing instructions code catalog.
2 Enter the identification number of the machinery, equipment or activity where air pollutants are generated, corresponding to the entries in the operation diagrams and summary table requested in Section 1.1, Operations.
3 Indicate whether the release is carried (C), fugitive (F) or open-air (A), if the combustion is open-air. When the release is carried relate it to the machinery, equipment or activity with the following Table 2.1.2, which requests the characteristics of the stacks or discharge ducts.
4 Indicate equipment capacity units as defined by the manufacturer. In the case of combustion equipment, indicate the nominal thermal capacity of the equipment in: cc (boiler horsepower), MJ/hr (megajoules/hour), kcal/hr (kilocalories/hour), BTU/hr (British Thermal Units/hour) or lb/hr (steam pounds/hour). When not applicable enter NA.
5 Burner type may be selected under Table 4.2 of the COA filing instructions code catalog.
6 Indicate whether the fuel used is natural gas (GN), LP gas (LP), heavy fuel-oil (CBP), light fuel-oil (CBL), gasoil (GO), diaphanous (DF), diesel (DI), gasoline (GA), coal (CA), coal coke (CCA), oil coke (CPE), bagasse (BG), cellulose (CL), wood (MA), formulated fuels (RC), specify which, or others (RO), entering the name of the fuel in the same space. When more than one fuel is used specify the type and quantity of each. When not applicable enter NA.
7 Annual consumption is reported in units of mass: mg/yr (milligrams/year), g/yr (grams/year), kg/yr (kilograms/year), t/yr (metric tons/year) or lb/yr (pounds/year), or volume: L/yr (liters/year), gal/yr (gallons/year), brl/yr (barrels/year), m^3/yr (cubic meters/year) or ft^3 /yr (cubic feet/year).

2.1.2 Characteristics of stacks and discharge ducts for emissions released in Table 2.1.1 above.

Duct or stack[1]	Point of release[2]	Related point(s) of generation[3]	Height[4] (m)	Height[5] (m)	Inner diameter or equivalent diameter (m)	Gas flow speed[6] (m/s)	Volumetric speed[6] (m^3/min)	Exiting gas temperature (ºC)[6]

1 Enter the name or identification number used at the establishment for the reported duct or stack.
2 Enter the identification number of the duct or stack from which air pollutants are released, according to the operations flowchart.
3 Indicate the generation points (established as a carried release in Table 2.1.1 for the equipment, machinery or activity under this section), associated with each stack or duct, so as to relate release points to generation points.
4 Height in meters of the stack or discharge duct, measured from floor level.
5 Height in meters of the stack or discharge duct, measured from the last perturbation.
6 Indicate the average results obtained from all monitoring performed in the reporting year, considering the average between the first and second monitoring run, at 1 atm, 25°C and dry base. These data should correspond to the stack gas and particle sampling when the guidelines of the respective standard are applied. Where no standard is applied and/or the exiting gas speed is unknown, the volumetric speed or temperature, and/or in the case of venting ducts, enter ND (not available) and state the reasons in the OBSERVATIONS AND CLARIFICATIONS section of this form.

2.2 STANDARDIZED AIR RELEASES. Report the results of the sampling and analysis conducted under the applicable standards.

Point of release[1]	Equipment or activity subject to standard[2]	Applicable standard[2]	Standardized parameters[2]	Maximum allowable value		Monitoring[4]						Control system or equipment	
				Quantity	Unit[3]	Monitored value[5]				Average value[6]	Unit[3]	Code[7]	Efficiency (%)[8]
						1	2	3	4				

1 Enter the number of the release point corresponding to the duct or stack from which air pollution is released, according to the required operations flowchart and summary table.
2 List the equipment or operations relating to each release point, according to Table 2.1.2 of this form, and indicate the corresponding standardized pollutant according to the activity carried on and the number of the current standard, as listed in Table 4.3 of the COA filing instructions code catalog.
3 The reported units of each pollutant should be indicated in accordance with the respective standard.
4 The sampling logs and related technical documentation should be kept in case it is required by Semarnat or Profepa. In the case of the parameters CO_2, CO, O_2, N_2 and NOx, under NOM-085-SEMARNAT-1994 the sampling period average should be reported. If this information is not available enter ND and state the reasons in the OBSERVATIONS AND CLARIFICATIONS section of this form.
5 Indicate the values for each monitoring performed during the year, considering the average between the first and second monitoring runs.
6 Indicate the average of all monitoring performed in the reporting year. Average of measurements from preceding point.
7 Indicate the air emissions control system(s) and/or equipment in accordance with Table 4.6 of the COA filing instructions code catalog. Use more than one code as needed. Where there are no emissions control systems or equipment enter NA (not applicable), or when this information is not available enter ND in the corresponding column.
8 Report the last control equipment efficiency value calculated for the reporting year. When not applicable enter NA or when no information is available enter ND.

2.3 ANNUAL RELEASES. The reporting of annual releases requested in the following table for each release point corresponds to the releases from the pollution-generating machinery, equipment or activities reported in Table 2.1.1. The releases of standardized parameters should be obtained using the measurement of emissions as specified in the corresponding Mexican Official Standards. When no standard applies, theoretically the releases are estimated using release factors, balances of materials, approximation based on historical data or mathematical release models. The corresponding worksheets should be kept to be made available to Semarnat or Profepa when so required. The measurement of standardized parameters should be done after the control system or equipment. Note that this table should not include the information reported in Section V.

Pollutant	Point of release[1]	Annual release		
		Quantity[2]	Unit[3]	Estimation method[4]
Sulfur dioxide (SO_2)				
Nitrous oxide (NOx)				
Total suspended particles (TSP)				
Carbon monoxide (CO)				
Carbon dioxide [5] (CO_2)				
PM-10 particles[8] (PM_{10})				
Total hydrocarbons[5,6] (THC)				
Volatile organic compounds [5,7] (VOCs)				
Others (specify)				

1 Enter the number of the release point corresponding to the duct or stack from which air pollutants are released, according to the required operations flowcharts and summary table.
2 Enter the annual quantity of the pollutant released.
3 The annual release is reported in units of mass: mg/yr (milligrams/year), g/yr (grams/year), kg/yr (kilograms/year), t/yr (metric tons/year) or lb/yr (pounds/year).
4 Indicate whether the method used to obtain the total annual quantity released per event was: direct measurement (MD), balance of materials (BM), approximation using historical data (DH), release factors (FE), engineering calculations (CI), mathematical modeling (MM) or other, specified in the same space (OM). The calculation worksheets should be kept along with the related technical documentation to be shown as required by Semarnat or Profepa. Show the reference(s) for release factors and name and version for mathematical modeling, in the same estimation method column.
5 To calculate CO_2, THC and VOCs, the use of AP-42 release factors from the U.S. Environmental Protection Agency document "Air Chief" are recommended. For further information, consult: www.epa.gov/ttn/chief/ap42/index.html
6 Report the release of total hydrocarbons (methanic and nonmethanic) released into the air by combustion equipment. Hydrocarbon emissions in processes not involving combustion equipment should be reported as volatile organic compounds.
7 If the establishment has measurements or estimates of specific volatile organic compounds from the PRTR listing published by Semarnat, it should report them by substance in Section V of this form (Pollutant Release and Transfer Register).
8 This information may be reported optionally on this table.

SECTION III. REPORTING OF DISCHARGES (RELEASES) INTO BODIES OF WATER AND TRANSFERS OF POLLUTANTS IN WATER

The following three tables relate the information on water usage to the wastewater release data. The last table of this Section requests the final discharge volumes finales, concentrations and annual releases of the standardized parameters into receiving bodies and sewers. For this Section, consult Tables 4.7, 4.8 and the hydrological region map in the code catalog found in the COA filing instructions.

3.1 USAGE. Report the establishment's water extraction sources.

Water extraction sources[1]	Number of concession title or assignment[2]	Hydrological Region[3]	Annual usage[4]	
			Quantity	Unit

1 Enter the origin of each of the company's extraction or supply source, indicating: drinking water network (AB), surface (FS), underground (ST), brackish (SL), internally treated water (TIN), externally treated water (TE), untreated reused water (AST), contaminated water collected and treated by a company for use in its process (ACE) or other (O), specified in the same space. Use more than one code as needed. When not applicable enter NA.
2 Indicate the number corresponding to the title or assignment, according to the jurisdiction of the source. When not applicable enter NA (such as in the case of trucked-in water).
3 The hydrological region from which the water supply is derived should be entered according to Table 4.7 of the COA filing instructions code catalog and the hydrological region map. When not applicable enter NA.
4 To report the quantity of water used, use units of annual volume: L/yr (liters/year), m^3/yr (cubic meters/year), ft^3/yr (cubic feet/year) or gal/yr (gallons/year).

3.2 WASTEWATER DISCHARGE

3.2.1 Discharges received by national water bodies (release) and sewer (transfer).

Type of discharge[1]	Discharge number[2]	Discharge origin[3]	Discharge destination[4]	Name of receiving national water body[5]	Hydrological Region[6]	Annual on-site treatment		
						Code[7]	Quantity	Unit[7]
Release	*Discharge1*							
	Discharge 2							
Transfer	*Discharge 3*							
	Discharge 4							

1 Indicate whether the discharge is a release (on-site wastewater discharge into nationally owned waters or properties), or a transfer (wastewater discharge into the sewer or for off-site reuse or treatment.
2 Number the discharges consecutively so as to identify them clear in Table 3.2.3.
3 Indicate whether the discharge is derived from: production process (PP), services and administration (SA), wastewater treatment (TAR), processes and services (PS), gas washing (LG), cooling systems (SE), rainwater (ALL), mixed currents (CMZ), water conditioning for industrial processes (AA) or other discharge types (OD), identified in the same space. Use more than one code as needed. When there are no wastewater discharges enter NA.
4 Indicate whether the discharge is transferred to the sewer (AL), released into a nationally owned receiving body (CR), used for farm irrigation (RA), used for the establishment's lawn watering RV), reused at the establishment (RI), for sale (VE) or other (O), specify. Use more than one code as needed.
5 For discharges received by a national water body (lagoon, river, sea, etc.) provide the name. Otherwise indicate NA.
6 The Hydrological Region where the national water body receives the wastewater discharge should be entered according to Table 4.7 of the COA filing instructions code catalog and hydrological region map.
7 The annual treatment should be in accordance with Table 4.8 of the COA filing instructions code catalog, reported in units of volume: L/yr (liters/year), m^3/yr (cubic meters/year), ft^3/yr (cubic feet/year) or gal/yr (gallons/year). Use more than one code as needed.

3.2.2 Total annual volume of wastewater discharges into receiving bodies that are national waters or properties (cubic meters): __________________

3.2.3 Annual releases and transfers of wastewater discharges. Note that this table should not include the information reported in Section V.

Parameter[1]	Discharge 1		Discharge 2		Discharge 3		Total annual release [6]	
	Volume 1= (L/year)[2]		Volume 2= (L/year)[2]		Volume 3= (L/year)[2]			
	Concentration[3] (mg/L)	Release[4] (mg/year)	Concentration[3] (mg/L)	Release[4] (mg/year)	Concentration[3] (mg/L)	Release[4] (mg/year)	Quantity	Unit[7]
Greases and oils								
Total suspended solids								
Total arsenic								
Total cadmium								
Total cyanide								
Total copper								
Hexavalent chromium								
Total phosphorus								
Total mercury								
Total nickel								
Total nitrogen								
Total lead								
Total zinc								
Other parameters[5]: ________								

1 Corresponding to parameters subject to measurement under Mexican Official Standards, or as applicable the particular discharge conditions established by the competent authority. When the value of the requested information is zero or undetectable, enter the number 0. When not applicable enter NA or when there is no available information enter ND.

2 Enter the annual volume of each discharge, in units of volume: liters/yr (L/year). Where there is a CNA permit, obtain this information from the sum of volumes reported in each quarterly report from the annual reporting period.

3 Report the average concentration of the pollutant in each discharge, in units of concentration: milligrams/liter (mg/L). Where there is a CNA permit, report the annual average annual concentrations reported in the quarterly reports corresponding to the annual reporting period. When the value of the requested information is zero or undetectable, enter the number 0. When not applicable enter NA or when there is no available information enter ND.

4 Enter the annual quantity of the pollutant or parameter released, in units of mass: milligrams/year, (mg/year). In this case, the release is calculated by multiplying the volume of the discharge by its concentration: V x C = E.

5 Specify the parameter referenced in the particular discharge conditions.

6 The total release quantity is the sum of pollutant emissions from all discharges.

7 The annual quantity of pollutants or parameters released is reported in units of mass: g/yr (grams/year), kg/yr (kilograms/year) or t/yr (metric tons/year).

SECTION IV. REPORTING OF HAZARDOUS WASTE GENERATION, MANAGEMENT AND TRANSFER

This Section requests information on hazardous waste, such as information on the generation and transfer of waste for reuse, recycling, coprocessing, treatment and final disposal, for hazardous waste-generating establishments and establishments providing a waste management service. To fill out this form, consult Tables 4.9 and 4.10 in the COA filing instructions code catalog.

4.1 REPORTING OF HAZARDOUS WASTE GENERATION AND TRANSFER. This Table should be filled out by hazardous waste-generating establishments (including treatment service companies that generate hazardous waste). The generator must contract the services of only companies authorized to handle hazardous waste (LGEEPA Article 151 BIS and Article 10 of the LGEEPA Regulations on Hazardous Waste).

Generation area[2]	Waste identification								Annual waste generation			Transfer of generated hazardous waste							
												Annual transfer of waste				Carrier name and authorization No.[10]	Collection center name and authorization No.[11]	Name and authorization No. of the hazardous waste management service company[12]	Location (Address, Municipality, State and Country) of the hazardous waste management service company
	NOM-052-SEMARNAT-1993[3]	Code[4]	C R E T I B[5]						Quantity	Unit[6]	New waste[7]	Quantity	Unit[6]	Type of transfer[8]	Handling code[9]				

1 Number assigned by Semarnat to the hazardous waste-generating industrial establishment.
2 Indicate whether the substance was generated in the input transport area (TI) and import storage area (AMP) during the production process (PP), product storage (PR), product transport (TP), product unloading (DES), auxiliary services (SAX), maintenance (MN), others (OA), specify. If no hazardous waste was generated in the reporting year, enter NA.
3 Name and identification number of the hazardous waste, according to NOM-052-SEMARNAT-1993 listing. If the waste is not listed, indicate Corrosive, Reactive, Explosive, Toxic, Flammable, or Biological-Infectious (CRETIB) characteristics.
4 hazardous waste code under Table 4.9 of the COA filing instructions code catalog, only if not found in the NOM-052-SEMARNAT-1993 listing or current standards.
5 When the hazardous waste is not listed in NOM-052-SEMARNAT-1993, mark with an X the initials for: (C) Corrosive, (R) Reactive, (E) Explosive, (T) Toxic, (I) Flammable, or (B) Biological-Infectious, corresponding to the characteristics of the waste's hazard.
6 The annual quantity of hazardous waste generated and/or transferred is reported in units of mass or volume: kg/yr (kilograms/year), t/yr (metric tons/year) or m^3/yr (cubic meters/year).
7 Mark with an **X** if the waste is a new waste generated by the establishment.
8 Enter the type of transfer. Waste transferred for: reuse (REU), recycling (REC), coprocessing (COP), treatment (TRA) or final disposal (DIF).
9 Enter the code from Table 4.10 of the COA filing instructions, corresponding the typical processes for reuse, recycling, coprocessing, treatment and final disposal of hazardous waste. Use more than one code as needed.
10 Indicate the authorization number for hazardous waste collection and transport service companies issued by Semarnat. If this number is not available enter ND and state the reasons in the OBSERVATIONS AND CLARIFICATIONS section of this form.
11 Indicate the authorization number for the collection center (storage) service company authorized by Semarnat. If this number is not available enter ND and state the reasons in the OBSERVATIONS AND CLARIFICATIONS section of this form.
12 Indicate the authorization number for hazardous waste reuse, recycling, coprocessing, treatment or final disposal (DIF) issued by Semarnat. If this number is not available enter ND and state the reasons in the OBSERVATIONS AND CLARIFICATIONS section of this form.

4.2 ON-SITE HAZARDOUS WASTE STORAGE. Enter the characteristics of the hazardous waste storage.

Warehouse No.	Type of storage[1]		Warehouse characteristics[2]			Hazardous waste stored					
	Roofed	Unroofed	Site	Ventilation	Lighting	Waste identification		Annual quantity[5]	Unit[6]	Form of storage[7]	Period[8] (days)
						NOM-052-SEMARNAT-1993[3]	Code[4]				

1 Mark the corresponding column with an **X**.

2 Indicate whether the site is closed (LC) or open (LA); if the ventilation is natural (VN), forced (VF) or nonexistent (VI); and whether the lighting is natural (IN), explosion-proof (NE) or not explosion-proof (SE).

3 Name and identification number of the waste, according to NOM-052-SEMARNAT-1993 listing.

4 Hazardous waste code according to Table 4.9 of the COA filing instructions code catalog.

5 Total annual quantity of hazardous waste stored.

6 Annual quantity of hazardous waste stored is reported in units of mass: mg/yr (milligrams/year), g/yr (grams/year), kg/yr (kilograms/year), t/yr (metric tons/year) or lb/yr (pounds/year).

7 Indicate if the form of storage is bulk (GR), metal container (CM), plastic container (CP), plastic bag (BP), cardboard container (CC) or other, specified in the same space (OF). Use more than one code as needed.

8 Maximum storage time for a lot of waste, in days.

4.3 HAZARDOUS WASTE MANAGEMENT. This table should be filled out only by companies that reuse, recycle, coprocess, treat or confine their own hazardous waste and/or service companies to which hazardous waste has been transferred for reuse, recycling, treatment and/or final disposal.

Treatment	RUPA or NRA[1]	Waste identification								Type of transfer[5]	Handling code[6]	Total handled		Collector and carrier data [8]			Name and Authorization No. of the hazardous waste management service company[10]
		NOM-052-SEMARNAT-1993[2]	Code[3]	C R E T I B[4]								Annual quantity [7]	Unit[7]	Quantity[9]	Unit[9]	Name and authorization No.	
On-site																	
Service company																	

1 Enter the Unique Registration Number of Accredited Persons (RUPA) or the Environmental Registration Number (NRA) of the customers to whom the hazardous waste management service is provided. If this number is not available state the reasons in the OBSERVATIONS AND CLARIFICATIONS section of this form.

2 Waste identification number under NOM-052-SEMARNAT-1993. If the waste is not listed, indicate Corrosive, Reactive, Explosive, Toxic, Flammable, or Biological-Infectious (CRETIB) characteristics.

3 Hazardous waste code in accordance with Table 4.9 of the COA filing instructions code catalog, only when not listed in NOM-052-SEMARNAT-1993 or current standards.

4 When the hazardous waste is not listed in NOM-052-SEMARNAT-1993, mark with an **X** the initials for: (C) Corrosive, (R) Reactive, (E) Explosive, (T) Toxic, (I) Flammable, or (B) Biological-Infectious, corresponding to the characteristics of the waste's hazard.

5 Indicate whether the waste was transferred for reuse (REU), recycling (REC), coprocessing (COP), treatment (TRA) or final disposal (DIF).

6 Enter the code from Table 4.10 of the COA filing instructions, corresponding the typical processes for reuse, recycling, coprocessing, treatment and final disposal of hazardous waste. Use more than one code as needed.

7 Annual quantity handled is reported in units of mass or volume: kg/yr (kilograms/year) or t/yr (metric tons/year) or m^3/yr (cubic meters).

8 Indicate the authorization number for hazardous waste collection or transport service companies, issued by Semarnat. If this number is not available enter ND and state the reasons in the OBSERVATIONS AND CLARIFICATIONS section of this form.

9 Annual quantity collected or transported is reported in units of mass or volume: kg/yr (kilograms/year) or t/yr (metric tons/year) or m^3/yr (cubic meters).

10 Hazardous waste management service company should enter the authorization number for reuse, recycling, coprocessing, treatment and/or final disposal. If this number is not available enter ND and state the reasons in the OBSERVATIONS AND CLARIFICATIONS section of this form.

SECTION V. POLLUTANT RELEASES AND TRANSFERS

This section reports the information on pollutant releases and transfers and the prevention and control of pure PRTR substances or substances contained in materials. The information is segregated by substance when found in inputs, as a formula component, in the chemical composition of hazardous waste, in the discharge of wastewater received by national water bodies, or as a component of gases released into the atmosphere. Table 5.5 of this Section should be filled out only by hazardous waste or wastewater management service companies that receive pure substances or substances contained in hazardous waste or wastewater discharges.

For this Section, consult the list of substances (see Transitional Article 3 of the LGEEPA Regulations on the Pollutant Release and Transfer Register), as well as the safety data sheets for the industrial establishment's inputs and products.

5.1 USE, PRODUCTION AND/OR COMMERCIALIZATION OF PRTR SUBSTANCES AT THE ESTABLISHMENT. This Table should be filled out by establishments that use, product or market substances subject to PRTR reporting.

Substantive activity		Name of material containing the substance[1]	Handling code[2]	Containing PRTR substances			Annual quantity[4]	Unit[5]
				Substance name[3]	Code or CAS No.[3]	% weight of the substance		
Substances used in process	Direct use[6]							
	Indirect use[7]							
Substances produced[8]								
Other uses[9]								

1 Indicate the general name of the input or material containing PRTR substances. In the case of pure substances enter NA and the name of the pure substance in the corresponding column.
2 The substance handling codes correspond to the respective activities (see points 6, 7, 8, and 9).
3 Name and code or CAS No. of the substance according to the Semarnat listing. When there is no code enter S/C.
4 Annual quantity of pure substance or substance contained in the input, hazardous waste or material.
5 Annual quantity is reported in units of mass: mg/yr (milligrams/year), g/yr (grams/year), kg/yr (kilograms/year), t/yr (metric tons/year) or lb/yr (pounds/year).
6 Substances used directly in process: imported and used as raw material (IM), pure raw material (MP), raw material component (CM), reactive (RE) or other (OT), specify.
7 Substances used indirectly in process, used as: catalyst (CA), solvent (SO), buffer (BU), refrigerant (RF), lubricant (LU), degreaser (DE), cleaner (LM), waste treatment (TR) or other (OT), specify. Use more than one code as needed.
8 Substances produced: indicate whether it forms part of the establishment's primary production (PP), used and processed on-site (UP), sold or distributed (VD), is a byproduct (SP), is an impurity in the product or byproduct (IM) or other (OT), specify. Use more than one code as needed.
9 Other uses: indicate if it is imported for direct sale (IV), if the substance or material containing it is packaged only for sale and/or distribution (EV), if it is used in packaging activities (EM), if it is used in auxiliary services (SA) or other (OT), specify. Use more than one code as needed.

5.2 RELEASES AND TRANSFERS OF PRTR SUBSTANCES. This table should be filled out by establishments that in the normal course of their activity have generated releases into any medium (air, water or soil) and/or transferred substances in water discharges and waste in the prior year.

Release/Transfer		Identification of listed substances			Generation area[2]	Annual release or transfer			Data on the hazardous waste and wastewater management service company where the substances were transferred		
		Name of the material containing the PRTR substance	Substance name[1]	Code or CAS No.[1]		Quantity	Unit[3]	Estimation method[4]	Name and Authorization No. [5]	Form of handling[6]	Address, state and country
Released to:	Air[7]										
	Water[8]										
	Soil[9]										
Transferred to:	Reuse[10]										
	Recycling[11]										
	Coprocessing[12]										
	Treatment[13]										
	Final disposal[14]										
	Sewer[15]										
	Other (specify)										

1 Name and code or CAS No. of the substance according to the Semarnat listing. When there is no code enter S/C.
2 Indicate whether the substance was generated in the input transport area (TI) and import storage area (AMP) during the production process (PP), product storage (PR), product transport (TP), product unloading (DES), auxiliary services (SAX), maintenance (MN), others (OA), specify. Use more than one code as needed.
3 The annual release or transfer of the substance is reported in units of annual mass: mg/yr (milligrams/year), g/yr (grams/year), kg/yr (kilograms/year), t/yr (metric tons/year) or lb/yr (pounds/year).
4 Indicate whether the method used to obtain the total annual quantity released per event was: direct measurement (MD), balance of materials (BM), approximation using historical data (DH), release factors (FE), engineering calculations (CI), mathematical modeling (MM) or other, specified in the same space (OM). The calculation worksheets should be kept along with the related technical documentation to be shown as required by Semarnat or Profepa. Show the reference(s) for release factors and name and version for mathematical modeling, in the same estimation method column.
5 Enter the name of the establishment to which the substances were transferred and the authorization number of the institution that authorized the hazardous waste or wastewater management or soil and aquifer treatment service company. When not applicable enter NA and when not available enter ND, stating the reasons in the OBSERVATIONS AND CLARIFICATIONS section of this form.
6 Enter the code from Table 4.10 of the COA filing instructions, corresponding to the typical processes of reuse, recycling, coprocessing, treatment and final disposal of hazardous waste.
7 Report air releases of PRTR substances not reported in Section II.
8 Report releases of PRTR substances in wastewater discharges received by nationally owned bodies not reported in Section III.
9 Report substance releases into soil, for example: subsoil leakage of water from on-site water treatment processes, lawn watering, on-site underground injection, spills, etc.
10 Off-site transfer of a substance in hazardous waste or water discharge for off-site reuse without a transformation process.
11 Substance transferred in hazardous waste or water discharge for off-site recycling using a transformation for reuse for production purposes.
12 Off-site transfer of a substance in hazardous waste or water discharge for coprocessing or environmentally safe integration.
13 Substance transferred in hazardous waste or water discharge for off-site treatment by physical, chemical, biological or thermal procedures, changing the characteristics of the waste, reducing its volume and hazard.
14 Transfer of a substance in hazardous waste or wastewater discharge for final disposal in facilities whose characteristics prevent an environmental release.
15 Transfer of a PRTR substance in water discharge into sewer.

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ANNUAL CERTIFICATE OF OPERATIONS 20_____

5.3 RELEASES OR TRANSFERS OF SUBSTANCES DERIVED FROM ACCIDENTS, CONTINGENCIES, LEAKS OR SPILLS, START OF OPERATIONS AND SCHEDULED STOPPAGES. This table should be filled out by establishments that issued or transferred substances due to on-site accidents, contingencies, leaks or spills. This information should be reported for each event occurring (including open-air combustion).

Release/Transfer		Identification of PRTR substance: Name of the material containing the PRTR substance	Substance name[1]	Code or CAS No.[1]	Quantity[2]	Unit[2]	Estimation method[3]	Event No.[4]	Event code[5]	Cause of event[6]	Type of handling[7]	Name and authorization No. of the hazardous waste or wastewater management service company[8]	Address, state and country where substances were transferred
Release	Air												
	Water												
	Soil												
Transfer	Reuse[9]												
	Recycling[10]												
	Coprocessing[11]												
	Treatment[12]												
	Final disposal[13]												
	Sewer[14]												
	Other (specify)												

1 Name and code or CAS No. of the substance according to the Semarnat listing. When there is no code enter S/C.
2 Annual substance releases or transfers are reported in units of mass: mg/yr (milligrams/year), g/yr (grams/year), kg/yr (kilograms/year), t/yr (metric tons/year) or lb/yr (pounds/year).
3 Enter whether the method used to obtain the total annual quantity released per event was: direct measurement (MD), balance of materials (BM), approximation using historical data (DH), release factors (FE), engineering calculations (CI), mathematical modeling (MM) or other, specified in the same space (OM). The calculation worksheets should be kept along with the related technical documentation to be shown as required by Semarnat or Profepa. Show the reference(s) for release factors and name and version for mathematical modeling, in the same estimation method column.
4 Assign a consecutive number (1, 2, 3, 4….) identifying each event occurring at the establishment.
5 Indicate whether the event was an explosion (EX), leak (FU), fire (IC), spill (DE), spill during land movement (DET), spill during sea, lake or river movement (DVA), start of operations and/or scheduled stoppages as duct boring during maintenance (PI), or other specified in the same space (OE). Use one line for each event occurring where a substance is released or transferred.
6 If the even had a human source or cause, indicate if it was due to the lack of a maintenance program (MT), lack of preventive maintenance (MP), lack of corrective maintenance (MC), carelessness (DS), scheduled event (due to contingency, training, safety, etc.) (EP), or other human cause specified in the same space (OH). If due to earthquake or tremor (TR), flood (ID), hurricane (HU), or other natural cause, specify (ON). Use more than one code as needed.
7 Enter the code from Table 4.10 of the COA filing instructions, corresponding to the typical processes of reuse, recycling, coprocessing, treatment and final disposal of hazardous waste. Use more than one code as needed.
8 Enter the name and authorization No. of the hazardous waste or wastewater management or soil and aquifer treatment service company. When not applicable enter NA and when not available enter ND, stating the reasons in the OBSERVATIONS AND CLARIFICATIONS section of this form.
9 Transfer of a substance in a hazardous waste or water discharge for reuse without a transformation process.
10 Substance transferred in hazardous waste or water discharge for recycling using a transformation for reuse for production purposes.
11 Transfer of a substance in hazardous waste or water discharge for coprocessing or environmentally safe integration.
12 Substance transferred in a hazardous waste or water discharge for treatment by physical, chemical, biological or thermal procedures, changing the characteristics of the waste, reducing its volume and hazard.
13 Transfer of a substance in hazardous waste or wastewater discharge for final disposal in facilities whose characteristics prevent an environmental release.
14 Substances transferred to sewer.

5.4 POLLUTION PREVENTION AND MANAGEMENT

5.4.1 Pollution prevention activities for PRTR substances.

Name of input, hazardous waste or material containing PRTR substances [1]	Containing PRTR substances		Physical state[3]	Prevention activities carried on at the source[4]	Application area for prevention activity[5]
	Name[2]	Code or CAS No.[2]			

1 Indicate el general name of the name input, hazardous waste or material (including wastewater discharge and liquid or gas process current) containing PRTR substances. In the case of pure substances enter NA.
2 Name and code or CAS No. of the substance according to the Semarnat listing. When there is no code enter S/C.
3 Indicate whether the input, waste or material containing PRTR substances is in a gaseous (GP), nonaqueous liquid (LN), aqueous liquid, (LA), solid (S) or semisolid (SS) state.
4 Indicate whether the following have been carried on: good operating or training practices (BOC), inventory control or procurement techniques (CIN), spill and leak prevention (PDF), input change (CMP), product change or redesign (CRP), modifications to equipment or production process (MPP), change in cleanup practices (CPL), surface preparation and finishing (PAS), on-site reuse, recycling or recovery (RRR), others, specify (O). State more than one activity as needed. Use more than one code as needed.
5 Indicate whether the prevention activity is applied in the input transport area (TI) and import storage area (AMP) during the production process (PP), product storage (PR), product transport (TP), product unloading (DES), auxiliary services (SAX), maintenance (MN), others (OA), specify. Use more than one code as needed.

5.4.2 On-site reuse, recycling, coprocessing, treatment and control of substances and/or final disposal.

Method	Name of hazardous waste or material[1]	Containing PRTR substances		Quantity[3]	Unit[3]	Method code[4]	Estimated efficiency[5] (%)
		Name[2]	Code or CAS No.[2]				
Reuse							
Recycling[6]							
Coprocessing[7]							
Air emissions control							
Wastewater treatment							
Hazardous waste treatment							
Final disposal							

1 Indicate the general name of the hazardous waste or material (including wastewater discharge and gaseous or liquid process current) containing PRTR substances. In the case of pure substances enter NA.
2 Name and code or CAS No. of the substance according to the Semarnat listing. When there is no code enter S/C.
3 Quantity of the substance reused, recycled, coprocessed, treated or disposed of at the established is reported in units of mass mg/yr (milligrams/year), g/yr (grams/year), kg/yr (kilograms/year), t/yr (metric tons/year) or lb/yr (pounds/year).
4 If the substance receives a treatment or disposal method within the establishment, report using Tables 4.6, 4.8 and 4.10 of the COA filing instructions. When not treated indicate the final disposal: confinement (DF1) or others (DF2), specified in the same space. Report more than one method as needed.
5 Indicate the estimated overall efficiency of the control and/or treatment methods used. When this information is not available state the reasons in the OBSERVATIONS AND CLARIFICATIONS section of this form.
6 Transformation of a substance for recycling con to be reused for production purposes.
7 Substance for coprocessing, i.e., environmentally safe integration of waste as an input in another production process.

5.5 TREATMENT AND/OR DISPOSAL OF PRTR SUBSTANCES BY SERVICE PROVIDERS. This table should be filled out only by reuse, recycling, coprocessing, treatment and/or final disposal service providers, to register PRTR substances contained in hazardous waste and/or wastewater (and generated by other establishments).

Substances contained in	Authorization No. of hazardous waste management service company[1]	Generator identification[2]	Identification of listed substance		Annual quantity received	
			Name[3]	Code or CAS No[3]	Quantity[4]	Unit[5]
Hazardous waste						
Wastewater						

1 State the hazardous waste treatment or disposal authorization number issued by Semarnat or the wastewater treatment authorization number issued by the regulatory agency. Where this number is not available state the reasons in the space for OBSERVATIONS AND CLARIFICATIONS on this form.
2 Enter the hazardous waste generator registration number issued by Semarnat, for the generator from whom the reported substance is received. If more than one generator forwards the same substances, as many lines should be used as there are different generators, repeating the substance name on each line. If this information is not known, enter the name and location (state, municipality and country, as applicable) of the establishment that generated the delivered waste.
3 Name and code or CAS No. of the substance according to the Semarnat listing. When there is no code enter S/C.
4 Total annual quantity received for reuse, recycling, coprocessing, treatment and final disposal. If the reported substance is received in different deliveries from the same generator, add all deliveries and report only the annual grand total. Remember for a different line should be used to report each generator.
5 The annual quantity received is reported in mass: mg/yr (milligrams/year), g/yr (grams/year), kg/yr (kilograms/year), t/yr (metric tons /year) or lb/yr (pounds/year).

5.6 REASONS FOR CHANGES IN SUBSTANCE RELEASES AND/OR TRANSFERS. When a substance is no longer reported under this section because it is no longer used, produced or generated as a result of the production activity, it should be stated in this table and/or reported in the section on general comments and suggestions.

Justification of changes in quantities of substance released or transferred in prior year.

Substance or Pollutant		Justification[2]	Chemical Management Program[3]	Comments
Name[1]	Code or CAS No.[1]			

1 Name and code or CAS number of the substance, according to the list established by Semarnat and reported throughout this form. Where you do not have a code, enter S/C.
2 Indicate whether the difference in quantities was due to the following reasons: change in production level (CNP), when any substance is no longer reported because it is no longer used, produced or generated (DRS), changes in estimation method (CME), pollution prevention activities have been implemented (APC), treatment changes within the establishment (CTI), changes in the transfer for treatment of final disposal (CDF), changes in transfer for reuse or recycling (CTR), change is insignificant if below 10% or without change (CNS), not applicable in the first reporting year for this substance (NA), or other (O), specifying such item in the same space. Indicate more than one code as needed, except for codes CNS and NA.
3 Report whether you have any Chemical Management Program in place at your industrial establishment, including alternative processes, environmentally rational substitute chemicals, etc.

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OBSERVATIONS AND CLARIFICATIONS

Use the following space to make any observations or clarifications regarding the information provided in the various tables on this form.

As applicable, and where such information is available, indicate how often the air quality perimeter tracking is done (indicating the month, the tracked parameter and the results. Optional.

GENERAL COMMENTS AND SUGGESTIONS